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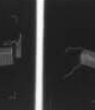
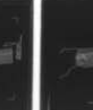
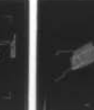
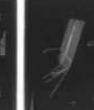
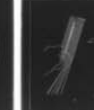
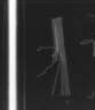
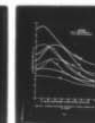
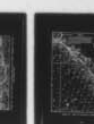
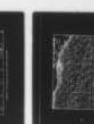
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MISCELLANEOUS PAPER H-78-2

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## PRELIMINARY EVALUATION OF WIND AND WAVE EFFECTS AT POTENTIAL LNG TERMINAL SITES, STATE OF CALIFORNIA.

APPENDIX B: AN EVALUATION OF THE RELATIVE WAVE CLIMATE AT SIX OFFSHORE LNG SITES CONSIDERING ISLAND INFLUENCES AND TOPOGRAPHIC EFFECTS.

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20. ABSTRACT (Continued)

*Liquefied Natural Gas (LNG)* *THIS*  
The U. S. Army Engineer Waterways Experiment Station (WES) was requested to assist in the preliminary evaluation of the wave climate at alternate potential LNG terminal sites by applying existing hindcast wave data of a general nature to obtain estimates of the times of excessive wave conditions at the various sites.

After the preliminary evaluation was completed, WES was again requested to assist by analyzing the effects of island sheltering and topographic influences on the wave climates of five onshore sites (Appendix A of H-78-2) and six offshore sites in order to provide a more refined estimate of the wave conditions existing at the potential sites. The deepwater hindcast wave data used in the evaluations were the State of California Department of Navigation and Ocean Development (DNOD) singular wave statistics, National Marine Consultants (NMC) and Marine Advisers (MA) deepwater hindcast data, and the Synoptic Shipboard Meteorological Observation (SSMO) data tapes. CCC completed and transmitted to PUC its final report evaluating and ranking the five onshore sites 31 May 1978.

Because of the absence of a comprehensive deepwater wave hindcast data base of sufficient degree of confidence to permit estimates of the absolute magnitude of occurrences of waves of different periods and heights, the analysis conducted is a relative evaluation only and should not be interpreted as projections of actual downtime, but rather as a consistently uniform basis for comparison. WES and others are at the present time engaged in a comprehensive program to provide a spectral hindcast of the California Coastal region; however, these results will not be available for approximately two years and the LNG site selection process cannot await these findings.

When the appropriate topographic coefficients had been applied to the deepwater hindcast wave data and the resulting wave climate at the potential offshore LNG site had been obtained, it was required that the effects of this resultant wave climate be determined on four possible terminal concepts at each of the six sites. These four concepts include: (a) fixed terminal with one pier, (b) fixed terminal with two piers, (c) floating barge, and (d) deepwater mooring tower. These results are included in this report.

Beyond the scope of this investigation, the possibility exists that each of the four concepts mentioned above can be restructured to produce as many as twenty different hybrid concepts to be considered at each of the six offshore sites.

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## PREFACE

The California Legislature decreed that the California Coastal Commission (CCC) had until 1 February 1978 to identify, evaluate, and rank alternate potential Liquified Natural Gas (LNG) Terminal sites on the California coast. Because of the Corps' experience in various aspects of such studies, the U. S. Army Engineer Division, South Pacific, was requested by CCC to assist, particularly in the use of existing hindcast data to evaluate possible effects of wind and waves on the docking and unloading of an LNG tanker. The U. S. Army Engineer Waterways Experiment Station (WES) was, in turn, asked to provide the technical assistance required by the request. Authority to proceed was received 1 December 1977.

Additionally, the California Legislature decreed that CCC should recommend to the California Public Utilities Commission (PUC) the location of one LNG site to be permitted and operated. WES was again asked to assist in this phase of the study by evaluating the effects of island sheltering, refraction, and shoaling on five onshore sites and six offshore sites which had been preliminarily recommended to PUC. Authority to proceed with this effort was received 15 March 1978 by ammendment to the original agreement between WES and CCC.

The study was conducted by personnel of the Hydraulics Laboratory, WES, under the general direction of Mr. H. B. Simmons, Chief of the Hydraulics Laboratory, and Dr. R. W. Whalin, Chief of the Wave Dynamics Division. Data analysis was conducted under the direct supervision of Mr. D. D. Davidson, Chief of the Wave Research Branch, and Dr. L. Z. Hales, Project Engineer, assisted by Messrs. R. D. Carver, D. G. Markle, and C. R. Curren, Research Engineers, K. A. Turner, Computer Specialist, R. E. Ankeny, Computer Technician, R. R. Bottin, Jr., H. F. Acuff, Jr., L. A. Barnes, Civil Engineering Technicians, and Ms. J. S. Jones, Civil Engineering Technician. The report was prepared by Dr. Hales.

Commander and Director of WES during the conduct of this study and the preparation and publication of this report was COL John L. Cannon, CE. Technical Director was Mr. F. R. Brown.

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CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI) AND  
METRIC (SI) TO U. S. CUSTOMARY UNITS OF MEASUREMENT

Units of measurement used in this report can be converted as follows:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
<u>U. S. Customary to Metric (SI)</u>		
acres	4046.856	square metres
degrees (angle)	0.01745329	radians
fathoms	1.8288	metres
feet	0.3048	metres
knots (international)	0.5144444	metres per second
miles (U. S. nautical)	1.852	kilometres
miles (U. S. statute)	1.609344	kilometres

Metric (SI) to U. S. Customary

cubic metres	264.172	gallons (U. S. liquid)
kilometres	0.6213711	miles (U. S. statute)
metres	3.280839	feet
radians	57.29578	degrees (angle)

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PRELIMINARY EVALUATION OF WIND AND WAVE EFFECTS  
AT POTENTIAL LNG TERMINAL SITES  
STATE OF CALIFORNIA

APPENDIX B: AN EVALUATION OF THE RELATIVE WAVE CLIMATE  
AT SIX OFFSHORE LNG SITES CONSIDERING ISLAND  
INFLUENCES AND TOPOGRAPHIC EFFECTS

PART I: INTRODUCTION

Statement of the Problem

1. The California Coastal Act of 1976 authorized but did not provide for the determination of the exact location of one liquefied natural gas (LNG) terminal in the coastal zone. California Senate Bill No. 1081, the Liquefied Natural Gas Terminal Act of 1977, was passed 19 April 1977 and granted to the Public Utilities Commission (PUC) the exclusive power to issue a permit concerning the construction and operation of an LNG terminal pursuant to a prescribed permit procedure. The bill also required the California Coastal Commission (CCC) to study potential sites for the terminal and to make recommendations thereon to PUC not later than 31 May 1978.

2. During legislative deliberations on the LNG Terminal Act, a number of interested parties raised the possibility that an offshore terminal might have significant advantages over any onshore terminal. The potential advantages include decreased safety risks to onshore populations, minimization of conflicts with residential and recreational use of the coast, and decreased adverse environmental impacts. In December 1977, CCC directed its staff to prepare detailed progress reports on the offshore LNG terminal project, and to have completed a draft final report by 31 July 1978. Twenty possible combinations of types of offshore terminals, sited in six zones, will be included in the evaluations, which will also cover the performance and reliability of each

terminal and site combination, safety, impact on marine and coastal resources, comparative costs, regulatory issues, and scheduling.

3. The U. S. Army Engineer Waterways Experiment Station (WES) was requested by the Executive Director of CCC to assist in the preliminary evaluation of the potential sites, and by letter of 15 March 1978 was again requested to assist in the final ranking and evaluation of the five onshore and six offshore terminal sites recommended to PUC by CCC. This phase of the overall study would be a relative evaluation of the wave climate at the potential sites by considering the effects of the offshore islands and the local topography on the incoming wave trains from deep water. Topographic effects were ignored in the preliminary study because of time and cost constraints.

4. The results of this relative evaluation of the five onshore sites were transmitted as Appendix A of this publication.

#### Site Locations

5. The six potential offshore LNG terminal sites listed in geographical order from north to south are:

<u>Name</u>	<u>Approximate Depth, ft</u>	<u>Latitude North</u>	<u>Longitude West</u>
Bechers Bay	50	33°59'50"	120°01'35"
Chinese Harbor	120	34°01'32"	119°38'00"
East Channel Shelf	300	34°16'00"	119°35'00"
Smugglers Cove	50	34°01'00"	119°32'00"
Smugglers Cove	120	34°00'30"	119°31'00"
Camp Pendleton	50	33°18'00"	117°31'00"

6. These site locations are shown in Figures B1, B2, and B3.

#### Bechers Bay

7. The Bechers Bay site investigation zone includes a potential island site on a large, level terrace where a shallow-water bottom-supported terminal could be sited around the 50-ft water depth contour in the bay. A floating barge-type terminal could also be sited in the deeper water.

8. Bechers Bay is located on the northeast portion of Santa Rosa



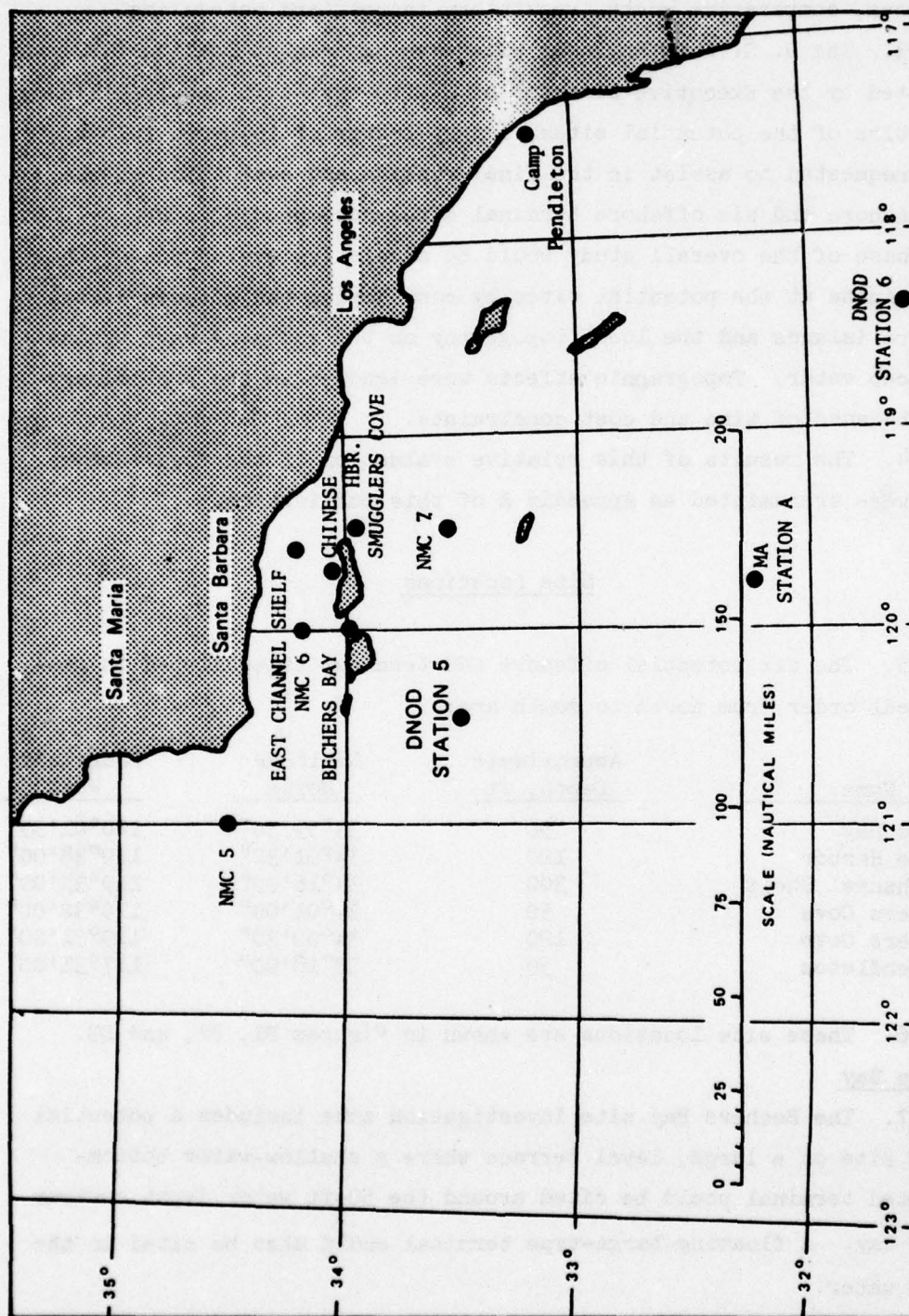


Figure B1. Site locations and data stations (deep water)

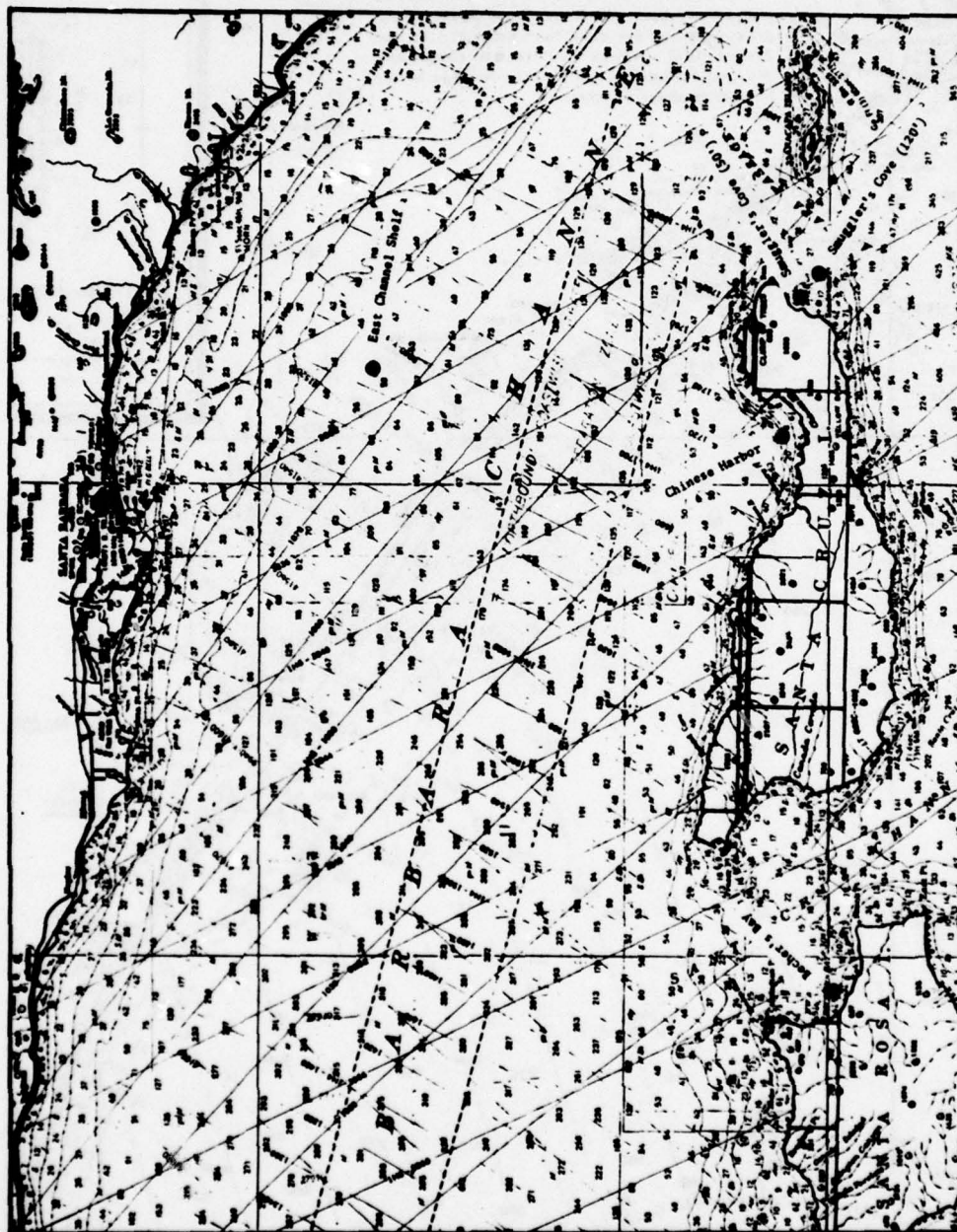


Figure B2. LNG site locations of Bechers Bay, Chinese Harbor, Smugglers Cove, and East Channel Shelf



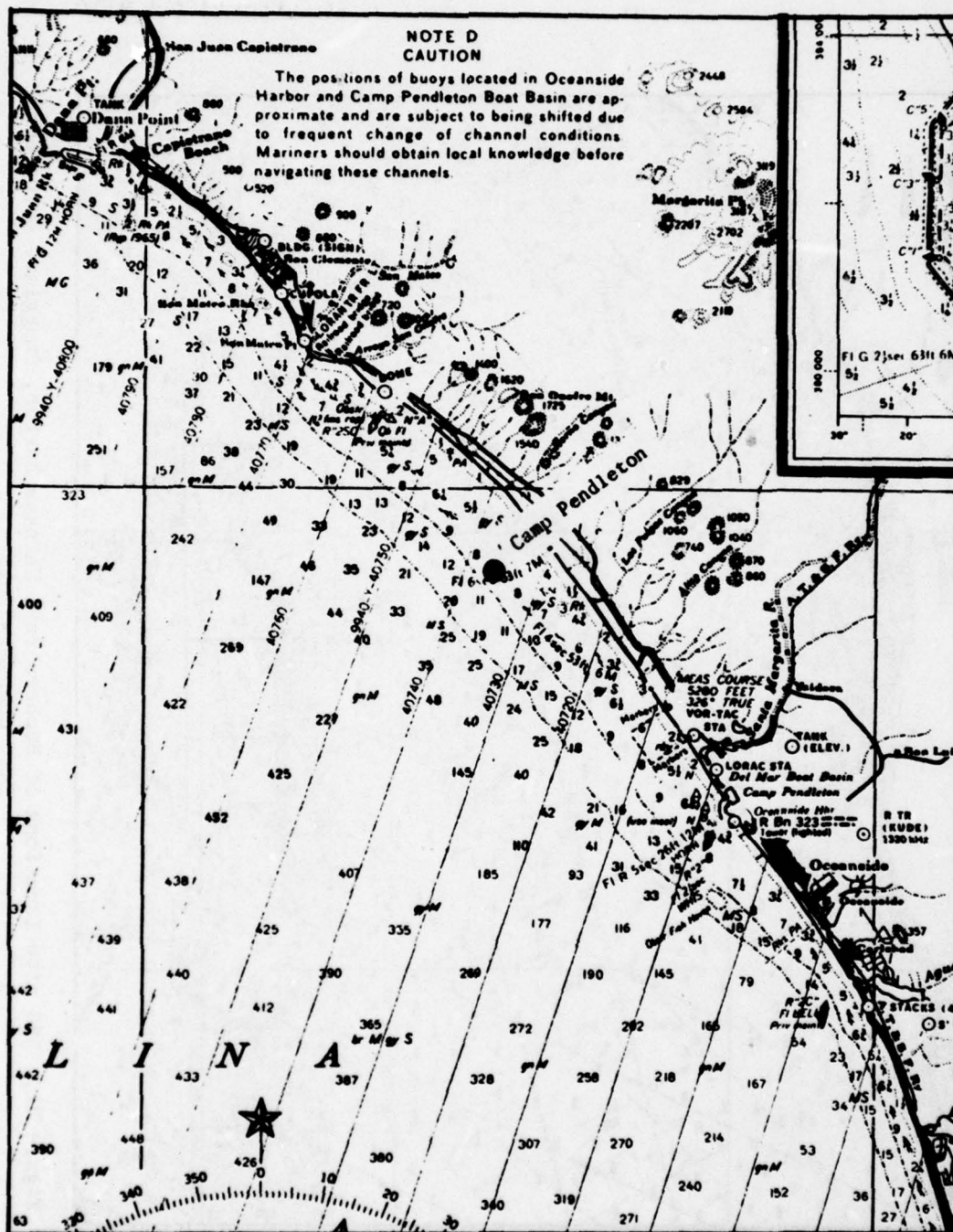


Figure B3. LNG site location of Camp Pendleton



Island near the western end of the Santa Barbara Channel. It is, therefore, considerably more exposed to waves approaching the channel from a northwesterly direction than are the other sites eastward of this location. National Marine Consultants (NMC)<sup>1</sup> hindcast wave data indicate that at their Station 5 positioned at the western approach to the channel, waves from the west and west-northwest are much more intense than those waves hindcast for Station 6 which is located approximately midway in the channel. Additionally, Station 6 cannot, of course, experience waves from the northwest because of the physical orientation of the coastline south of Point Conception. Thus, Bechers Bay is subjected to large wave conditions, both sea and swell, in the winter months from those storms originating in the northern hemisphere, while the summer months are essentially calm. These conclusions are consistent with observational reports from local residents.

9. Any terminal in Bechers Bay should be inside a line between Carrington Point and Skunk Point to provide as much protection as possible from westerly and northwesterly swell and military traffic. The Santa Cruz Channel between Bechers Bay and Santa Cruz Island just east of this site zone lies within the critical operation area established by the Pacific Missile Test Range. This is a very remote area, but because of the remoteness the area has valuable marine resources. The area is used for scuba and skin diving as well as commercial and recreational fishing.

#### Chinese Harbor

10. The Chinese Harbor site investigation zone is shielded to a greater extent from the northwest swell than is Bechers Bay. However, a much larger percentage of westerly sea and swell is able to penetrate this location, and this direction contributes a significant portion of the wave climate existing in the Santa Barbara Channel. No appreciable amount of northwest swell reaches this site because of the blocking effect of the California coastline south of Point Conception. Southern swell is precluded from this region, as is also the case at Bechers Bay.

11. The Chinese Harbor zone includes possible sites for a

platform, a floating, or a subsea type of terminal design, but sufficiently level land sites may be inadequate. This site zone boundaries are limited by the 30-ft depth contour, south and east, to avoid the surf zone and rocky intertidal areas. Another limitation is the 2-mile separation zone from Santa Barbara Channel ship traffic lanes, east and north, and the Pacific Missile Range, west.

#### East Channel Shelf

12. The East Channel Shelf potential LNG terminal site is located in the Santa Barbara Channel north of the traffic lanes off the east end of Santa Cruz Island and approximately halfway between Ventura and Santa Barbara. This site receives strong westerly swell particularly in the winter and also experiences a considerable amount of sea waves arriving from a southeasterly direction.

13. This zone provides a broad, gently sloping bottom area and has been leased to oil companies for petroleum exploration and development. Some exploratory drilling is being conducted at the present time in this region. This area was selected primarily to provide a site for a subsea bottom-supported type of terminal, which requires depths of about 300 ft and a fairly level bottom. This zone's depths range from the 270- to 330-ft contours about nine miles from the mainland. A floating type terminal could also be sited in this area.

14. The East Channel Shelf site zone is further defined by the Federal Ecological Buffer Zone on the west, a two-mile separation from the vessel traffic lanes through the channel on the south, and the areas of excessive bottom slope on the east and north. The wave climate at this location is essentially unaffected by refraction and shoaling, except for those long-period waves penetrating from the westerly direction. The short-period sea waves are approximately those hindcast at the nearby National Marine Consultants Station 6, as this is the data believed to be most representative of this potential site.

#### Smugglers Cove

15. The Smugglers Cove site investigation zone can accommodate shallow, bottom-supported platforms, or floating types of terminals. This zone extends to a depth of 100 ft, ending here to avoid



interference with traffic through the Anacapa passage. Smugglers Cove is located on the southeast corner of Santa Cruz Island and is essentially shielded and protected from the western and northwestern sea and swell to which Bechers Bay and Chinese Harbor are exposed on the northern side of the islands. The southern limit of this zone is set to avoid the critical operation area of the Pacific Missile Test Range. Smugglers Cove is a popular recreational boating anchorage and has a wide sand beach used for swimming.

16. There are two potential LNG terminal sites located in this zone. The deeper water site farther offshore receives a greater contribution of open-water sea and swell than does the more shielded shallow-water site nearer the shore. This cove has a tendency to spread the wave energy which is coming into the region over a larger area, and while the shoaling effect still exists, the combined effect of shoaling and refraction is one of a decrease in wave height and energy per crest length, for most combinations of wave period and approach direction.

17. Five of the six sites being considered for an LNG offshore terminal are clustered around Santa Cruz Island. A considerable amount of wave hindcast data has been developed by National Marine Consultants for this region, and will constitute the base from which site climatology will be deduced.

#### Camp Pendleton

18. Camp Pendleton is effectively shielded from the large northwesterly waves occurring in the open ocean. Northern swell is diffracted around the islands and there is a large occurrence of low amplitude wave energy at this site. A background swell of from 1 to 2 ft is always present inside the channel islands, but this is of no consequence from the standpoint of terminal operation. The preliminary evaluation indicated this to be one of the most favorable sites from the maritime factors evaluation.

19. This terminal site investigation zone extends from the surf zone about the 30-ft depth on the east to the edge of a steep underwater escarpment seaward and to the west. On the north and south the zone is defined by a four-mile distance from the city of San Clemente and a

Camp Pendleton living area. Within the zone a bottom-supported shallow-water terminal could be sited about 2 to 2.5 miles from shore, a floating terminal 2.5 to 5 miles from shore, and possibly a subsea terminal 5 miles out. But the depth at 5 miles, 260 ft, is barely adequate to provide ship passage over submerged storage tanks, and beyond 5 miles the bottom slopes down sharply so there is no suitable deeper site.

## PART II: DATA SOURCES

20. As previously discussed, the preliminary evaluation was conducted for sites situated throughout the extent of the California coastline from the Oregon border to the international border with Mexico. Accordingly, it was desired to use a comprehensive data source of sufficient areal extent to encompass the entire study regime. The deep-water statistics compiled by Meteorology International, Inc. (MII)<sup>2</sup> for the State of California's Department of Navigation and Ocean Development (DNOD) appeared to adequately meet this requirement although it was realized that these data were developed by the use of a "singular wave model" algorithm for deriving the wave field from the wind field. The more sophisticated, and probably more accurate, approach is to store at each grid point the energy spectrum for sea and swell by the use of a "spectral wave model." At the time the DNOD study began, the only data base available which was suitable for the development of wave climatologies at the six MII stations had been derived using the Navy's Fleet Numerical Weather Central's (FNWC) singular model. For the future, improved wind fields used in conjunction with a spectral model should give an even closer approach to absolute reality, and indeed the Navy has now changed to the spectral approach.

21. Since the MII wave statistics had been utilized in the relative evaluation of the onshore site at Camp Pendleton, it was decided to again apply these same deepwater MII statistics at the Camp Pendleton offshore potential LNG terminal site. In effect, these two sites are in the same vicinity and in approximately the same water depth (60 ft versus 50 ft). Thus the only real difference between the expected wave climates at the two sites can be essentially attributed to the effects of the localized topography, although vastly different criteria of exceedance is being applied to the offshore site location.

22. The DNOD data contain information on only northern hemisphere swell and sea conditions at the stations. The only source of southern hemisphere swell data in deep water appeared to be the statistics of Marine Advisers (MA).<sup>3</sup> Hence, these southern hemisphere data were used



to supplement the DNOD statistics of the northern hemisphere at the Camp Pendleton site, and also at the Smugglers Cove sites although the DNOD data were not applied here due to the existence of another hindcast data station near Smugglers Cove.

23. Both the DNOD and MA statistics are strictly applicable to locations in deep water approximately 100 miles offshore. The harboring effect produced by the Channel Islands required supplemental information regarding the localized conditions near shore. NMC had previously established three hindcast data stations around the Channel Islands (Figure B1), and these hindcast stations were clustered near five of the proposed LNG offshore sites. Accordingly, it was decided that these NMC stations would most nearly provide the required information regarding deepwater wave statistics to be transferred to the LNG site.

24. For comparative purposes at the East Channel Shelf site, the NMC data were evaluated along with the wave fields accessed from the Synoptic Shipboard Meteorological Observations (SSMO) data tapes.

25. Other isolated studies of the wave regime at specific locations have been completed, such as the Oceanographic Services, Inc.<sup>4,5</sup>; however, it was believed a relative evaluation could best be obtained by the use of systematically derived data over a wide area even though the site-specific studies could be extremely useful in avoiding gross errors in computation.

26. Sea is the term applied to short, steep waves which are still in or near the area in which they were generated, as distinguished from swell, which refers to longer, flatter waves which have left the generating area and have begun to change their physical characteristics through the processes of sorting and decay. In order to forecast sea it is necessary to have data representative of the winds over the water area immediately to windward of the forecast station. In this present study the winds of interest are associated either with storms that have invaded southern California waters with strong pressure gradients over the area, or with the everyday sea breeze.

27. Wind conditions vary greatly as one proceeds offshore from the southern California coast, as there is a characteristic



transformation from relatively mild winds over the inner channels to strong gusty winds outside the islands. The transition zone extends southeastward from Point Conception in a direction which corresponds roughly to the orientation of the southern California coastline.

28. The sea statistics tabulated in the published literature, strictly speaking, apply only to the station location. When the sea waves leave the station area and propagate shoreward they become, in effect, "decayed sea." Thus, if the area of interest is a significant distance from the deepwater station, additional allowance should be made for the supplemental sea waves (local sea) that has been generated near the point of concern. The relative percent times of excessive wave climate developed in this study for the six offshore potential LNG terminal sites include the contributions from northern swell, decayed sea, and/or southern swell and/or local sea, as required. The local sea characteristics were developed from the wind fields accessed from the SSMO data tapes.

29. Most knowledgeable researchers agree that the spectral approach is significantly better than the singular approach in wave modeling. In fact, WES is presently engaged in a 5-year wave-hindcasting program for the entire coastline of the United States using spectral wave models, with funding on the order of 3 million dollars. However, the data results for the coast of California will not be available until the latter part of 1979; hence, it is not possible to delay the selection of the LNG tanker terminal site until these comprehensive data become available. The only alternative is to proceed with a relative analysis based upon the best information presently in existence, and to realize and acknowledge that the absolute results may differ from the relative values so obtained.

### PART III: TOPOGRAPHIC EFFECTS

30. Since the wave statistics which are being applied to the Camp Pendleton potential LNG terminal site originate in deep water beyond the sheltering islands, it is necessary to consider the effect of the islands on the incoming wave train in addition to the localized underwater hydrography effects at this and at all other sites.

#### Island Sheltering Effects

31. If the offshore sites south of Point Conception were not sheltered by the offshore islands, particularly San Clemente, Santa Catalina, Santa Cruz, and Santa Rosa, waves would come in over a wide range of directions even if the direction of the wind in the generating area was relatively constant. According to Arthur,<sup>6</sup> variability of wave direction makes a path of at least  $45^\circ$  on each side of the wind. A directional beam pattern of wave intensity of the form  $(1 + \cos 2\theta)$  has been shown to approximate this spreading function. In effect, the intensity is proportional to the square of the wave height, and this is consistent with observational data. The result of sheltering then is to prevent certain parts of the wave fan from reaching the protected area.

32. In investigating island sheltering, the first consideration is to determine which directions of approach are open to waves of various periods and which are blocked. This cannot be accomplished by simply inspecting the sea level contours of the islands, for shoal water can act as a barrier just as effectively as an island shore. The blocking action depends on both water depth and wave period, with long-period waves requiring deeper water for passage than short-period waves; and as a result, any given opening between two islands will present a narrower portal to a long-period wave than it will to a short-period one. With the aid of precise bottom-contour charts, all such avenues of approach were listed, and the required integrations were performed by digital computer. The theory yields not only height-reduction ratios



but indicates modification in direction as well. Periods are assumed to remain unchanged.

33. The direction modifications are necessary because in some cases sheltering will block out part or all of the primary central portion of the direction sector of a train of approaching waves. When this happens, the wave energy reaching the hindcast point will obviously come from around the two ends of the barrier, and the resulting modified wave train will come from a direction within the original sector but modified toward that end of the barrier around which the larger part of the remaining wave energy came.

34. The island sheltering coefficients, or percent remaining of the original deepwater wave heights, and the resulting azimuths of the deepwater wave trains are presented for Camp Pendleton in Tables Bla and Blb.

35. Because the remaining offshore potential LNG terminal sites are in close proximity to the deepwater NMC wave stations, these additional five sites are essentially unaffected by island sheltering effects between the LNG site and the deepwater data stations.

#### Refraction and Shoaling Effects

36. The speed of propagation of a surface gravity wave depends on the depth of water in which the wave propagates. As the wave celerity decreases with depth, the wavelength must decrease proportionally for the period to remain unchanged. Variation in wave velocity occurs along the crest of a wave moving at an angle to underwater contours because that part of the wave in deeper water is moving faster than the part in shallower water. This variation causes the wave crest to bend toward alignment with the contours. This bending effect, called refraction, depends on the relation of water depth to wavelength. It is analogous to other types of waves, such as light or sound.

37. As waves propagate from deep water into shallower water, changes other than refraction take place. The assumption generally made is that there is no loss of energy and negligible reflection. The power

being transmitted by the wave train in water of any depth is equal to the power being transmitted by the wave system in deep water. The wave period remains constant in water of any depth, whereas the wavelength, velocity, and height vary.

38. The transformation of irregular ocean waves is a complex process which is not fully understood. The usual method of treating the problem which is quite successful is to represent the actual system by a series of sinusoidal waves of different heights, periods, and phases. Such a system now has a two-dimensional energy spectrum. The wave statistics being analyzed in the present study are treated in such a manner.

39. The effects of refraction and shoaling are important for several reasons. These phenomena determine the wave height in any particular water depth for a given set of incident deepwater wave conditions, i.e., wave height, period, and direction of propagation in deep water. Refraction and shoaling, therefore, have significant influence on the wave height and distribution of wave energy along the coast. The change of wave direction of different parts of the wave results in convergence or divergence of wave energy and materially affects the forces exerted by waves on structures.

#### PART IV: SITE EVALUATION PROCEDURES

40. The process by which the percent of time that each potential LNG terminal site was subjected to a wave climate in excess of that deemed allowable by appropriate criteria began by a determination of the relative wave conditions at the site by propagating the deepwater wave statistics landward or islandward. The predominant source of open-ocean data used in this evaluation was the DNOD singular wave statistics for decayed sea and northern swell and MA southern swell at Camp Pendleton, and NMC hindcast data around the Channel Island sites supplemented with MA southern swell and local sea characteristics where applicable.

41. The justification for the use of the southern swell data of MA Station A lies in the fact that this swell originated thousands of miles away in the South Pacific Ocean, and another hundred miles or so of further propagation will not significantly alter the characteristics. On the other hand, the DNOD sea and northern swell data are provided at discrete locations and exhibit significant though slowly varying differences between stations. For this reason, a linear interpolation based on their proximity to the potential LNG site was performed for obtaining the appropriate deepwater statistics to be utilized at Camp Pendleton.

42. When the actual statistics from MA and NMC had been obtained (also SSMO data at East Channel Shelf) and the hypothetical statistics from the actual DNOD data for Camp Pendleton, they were redistributed in the period bands by assuming a uniform distribution of occurrences over the wave-height bands and applying the appropriate island sheltering coefficients where necessary and the corresponding refraction and shoaling coefficients in all cases. These coefficients are all a function of the wave period and deepwater approach azimuth; thus it was necessary to systematically compute the possibilities of these coefficients for each period band and direction band occurring in the tables of statistics.

43. It was desired to obtain a coefficient representative of a finite but relatively precise area encompassing the potential LNG site.



For this reason a region approximately 1-1/2 to 2 miles in length parallel to the shoreline and centered about the LNG site tentative location was saturated with fairly uniformly spaced wave orthogonals propagated from deep water shoreward by numerical techniques which solve the fundamental governing differential equation of wave motion on the surface of a relatively incompressible fluid. The average value for a large number of these wave rays was determined at the appropriate mllw depth contour and the corresponding refracted angle of approach at the terminal site was retained. Because of the large number of computer plots generated in this process, only alternate but representative examples are included in this publication. All plots and computer output associated with these displays will be retained at WES for future disposition to interested parties.

44. The coefficients thus obtained and the resulting site angles of approach, respectively, are presented in Tables B2a and B2b for Camp Pendleton, Tables B3a and B3b for Bechers Bay, Tables B4a and B4b for Chinese Harbor, Tables B5a and B5b for Smugglers Cove 50-ft depth, Tables B6a and B6b for Smugglers Cove 120-ft depth, and Tables B7a and B7b for East Channel Shelf. These data of Tables B2a-B7b were then applied to the deepwater statistics previously obtained (sheltered, in the case of Camp Pendleton); and through the redistribution process previously discussed, the resultant statistics of decayed sea, northern swell, and southern swell were developed.

45. In addition, the local sea wave climate nearshore resulting from the wind effects produced by the meteorological condition at the site must be considered. These phenomena were evaluated by obtaining wind values from the SSMO data tapes and hindcasting the resulting local sea wave climate. Because these short-period waves propagate essentially in the direction of wind movement and, for practical purposes, are already onsite, they were not subjected to the refraction processes previously discussed. These wind data are summarized in Table B8.



## PART V: LNG OFFSHORE TERMINAL CONCEPTS

46. The CCC has contracted with three terminal design-construction firms for illustrative designs of three types of offshore LNG terminals, and the following narration is taken essentially from Rust and Baird.<sup>7</sup> These three designs were selected because they illustrate the three basic configurations for supporting and placing the elements of an LNG terminal offshore; additionally, island-based terminal sites will be similar to mainland onshore designs, so that ultimately four different concepts are being evaluated.

47. The fixed berth concept, the General Dynamics floating barge terminal concept, the Preload-Dravo concrete shallow-water bottom-supported concept, and the Norwegian Contractors concrete deepwater subsea bottom-supported tower concept, while promising, are not judged at this time to be the most appropriate terminal concepts. They were selected to illustrate clearly the full range of different types of terminals and to provide CCC with site-specific designs for evaluation. If these four basic designs are dissected and rearranged in other possible combinations, all other major configurations can be constructed. The final CCC evaluations of this project will address 20 different facility-site hybrid combinations.

48. These design studies also serve the purpose of providing detailed information which can be taken to regulatory agencies for their evaluation, as these agencies with site-specific information in-hand can make more realistic estimates of the likelihood of approval and of the time the application processing might take. These designs also permit the development of specific conditions which will mitigate adverse impacts of potential offshore LNG terminals.

### Island-Based Fixed Terminals

49. The island-based fixed terminal designs would be similar to mainland onshore designs with storage tanks and process plants onshore and a trestle with cryogenic pipeline connecting them to a berth in 50- to 60-ft mllw water depths.

### Shallow-Water Bottom-Supported Platform Design

50. CCC has contracted with a consortium of Preload Technology and Dravo/Van Houten Engineers for a concept design of a terminal supported in shallow water by concrete piles. The spread-out design would cover about 50 acres of water area with the major feature being two huge prestressed concrete cylindrical LNG storage tanks each about 340 ft in diameter to distribute the weight evenly over the supports. The two tanks would rest on cellular concrete slabs which will serve as barges for towing the tanks to the site. Then the slabs would be lowered onto support pilings by adding ballast. Piles would support the process plant, berth, and living quarters, and trestles would connect the terminal elements with pipelines and walkways. The berth must be in 50 ft of water to receive the LNG tankers, while the other elements can be in shallower water toward shore.

### Floating Barge-Type Terminals

51. The Coastal Commission contracted with the Quincy Shipyard Division of General Dynamics for a concept design of a floating barge-type LNG terminal. The steel barge would be 800 ft long and 285 ft wide with a draft of 35 ft. LNG would be stored in 10 aluminum spheres each able to hold 25,000 cu m of LNG. The tankers would berth alongside the barge, and the mooring system would be a single anchor leg mooring attached to the bottom with a concrete slab through which piles would be driven into the seabed. A yoke which can swivel would attach the barge to the mooring anchor leg, so the barge could "weathervane" to take advantage of wind and wave conditions and directions for berthing tankers. The gas transmission pipeline would extend through the yoke and down the rigid anchor leg to the sea bottom and then to shore. The single anchor leg has the advantage of providing a rigid support for the gas line, but it places great reliance upon the universal joints at each end of the anchor leg through which the gas and all the mooring forces are carried.



### Deepwater Bottom-Supported Design

52. The Commission has contracted with Norwegian Contractors for a design of a deepwater bottom-supported LNG terminal similar to the oil production, storage, and terminal facilities designed for oil companies operating in the North Sea. This LNG terminal design concept is a cluster of 19 reinforced concrete cylinders, with the middle cylinder extending to the surface as a tower. This tower would support the process plant and a tanker mooring system and an LNG transfer system would use a crane to reach the ship's bow. The cylinders would rest on a hexagonal pad about 420 ft wide in 300 ft of water to provide clearance above the cylinders for a ship's keel. Ten cylinders would be used for LNG storage and eight for ballast. Piping would be located in access tunnels underneath the storage cylinders, and access tunnels with atmospheric conditions would extend to the base of the shaft. The stable mooring tower would permit berthing and LNG transfer in more severe wind and wave conditions than could be tolerated alongside a barge or fixed pier because this system can "weathervane." The overriding questions affecting the feasibility of this type of terminal offshore of California, however, lie in the areas of responses to potential earthquakes, foundation design, and foundation/sea-bottom interactions.

### Hybrids

53. The four "pure" types of LNG terminals discussed above provide the basis for analyzing the range of siting requirements and design considerations for an offshore LNG terminal, but they may not represent the most appropriate type of terminal for some suitable sites. The ultimate hybrid designs will involve placing part of a terminal onshore and part offshore, or placing some elements on floating structures and others on bottom-supported platforms.

## PART VI: EVALUATION CRITERIA

54. Because of the wide variety of LNG offshore terminal facility concepts being considered, there exist many more possibilities of limiting criteria to be applied than that previously utilized in the evaluation of the onshore potential LNG sites. Since the same basic configuration of the onshore sites is still being considered for application at the offshore regions, the criteria remain the same for this concept; however, the other remaining facilities have other widely varying considerations.

### Island-Based Fixed Terminals

55. Tugboats and line-handling boats which normally service tankers and large carriers by assisting in the docking process have difficulty operating in wave heights above 6 ft, regardless of period or direction. Hence, from the standpoint of docking assistance, the relative wave climates at the individual sites were evaluated to ascertain that percent of the year in which all wave occurrences exceeded 6 ft.

56. Delft Hydraulics Laboratory<sup>8</sup> was commissioned by Pacific Indonesia LNG Company to provide scientific and engineering services for the design of the proposed Oxnard marine terminal off Port Hueneme, California. These services were to include: (a) refraction computations to convert offshore wave data into values applicable for the terminal site, (b) study of mooring operations and computations of required tug power, and (c) model tests on hawser and fender forces of the LNG carrier and statistical computations to determine the optimum terminal orientation.

57. Physical model tests were performed using a scale model of an LNG tanker subjected to the statistical wave climate referred to above. The wave heights and wave directions for each cumulative frequency distribution had been corrected for shoaling and refraction. For a certain terminal orientation the wave direction for each frequency distribution was related to a certain relative angle (relative angle between the



wave direction and the terminal heading). Each frequency distribution was also related to a certain wave period. At a certain terminal heading at each frequency distribution, a certain height could be allocated via the angle and the period. The percentages of exceedance of the heights gave the downtime for the chosen terminal heading. In this way it is possible to compute the downtime for all terminal orientations. The allowable wave-height optimization criteria for different terminal headings are presented in Figure B4.

58. A large portion of yearly downtime is caused by limitations on the operating condition for tugs and line boats. It is generally assumed that these vessels cannot operate at wind speeds over 25 knots. When sea waves are high, winds are usually high; thus downtime because of large wave conditions should not necessarily be added to downtime due to excessive winds.

#### Shallow-Water Bottom-Supported Platform Design

59. The limiting criteria for this and the two subsequent offshore LNG terminal design concepts were transmitted to WES by Reese\* after consultations with the CCC.

60. The shallow-water bottom-supported platform concept will be evaluated as if it consisted of two fixed terminals at different orientations. The Delft Hydraulic Laboratory limiting criteria would have to be exceeded at both terminals for the conditions to become excessive, since when limiting waves arrive from one direction the tanker would be permitted to move to the second terminal. Also under these considerations line boats might not be utilized at all, and the assisting tug boats could probably withstand waves of 8 ft in height. The limiting wind speed would again remain at 25 knots.

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\* W. Phillip Reese, John J. McMullen, Associates, Oxnard, California, Prime Contractor to CCC for LNG site evaluations, Personal Communication, 12 May 1978.

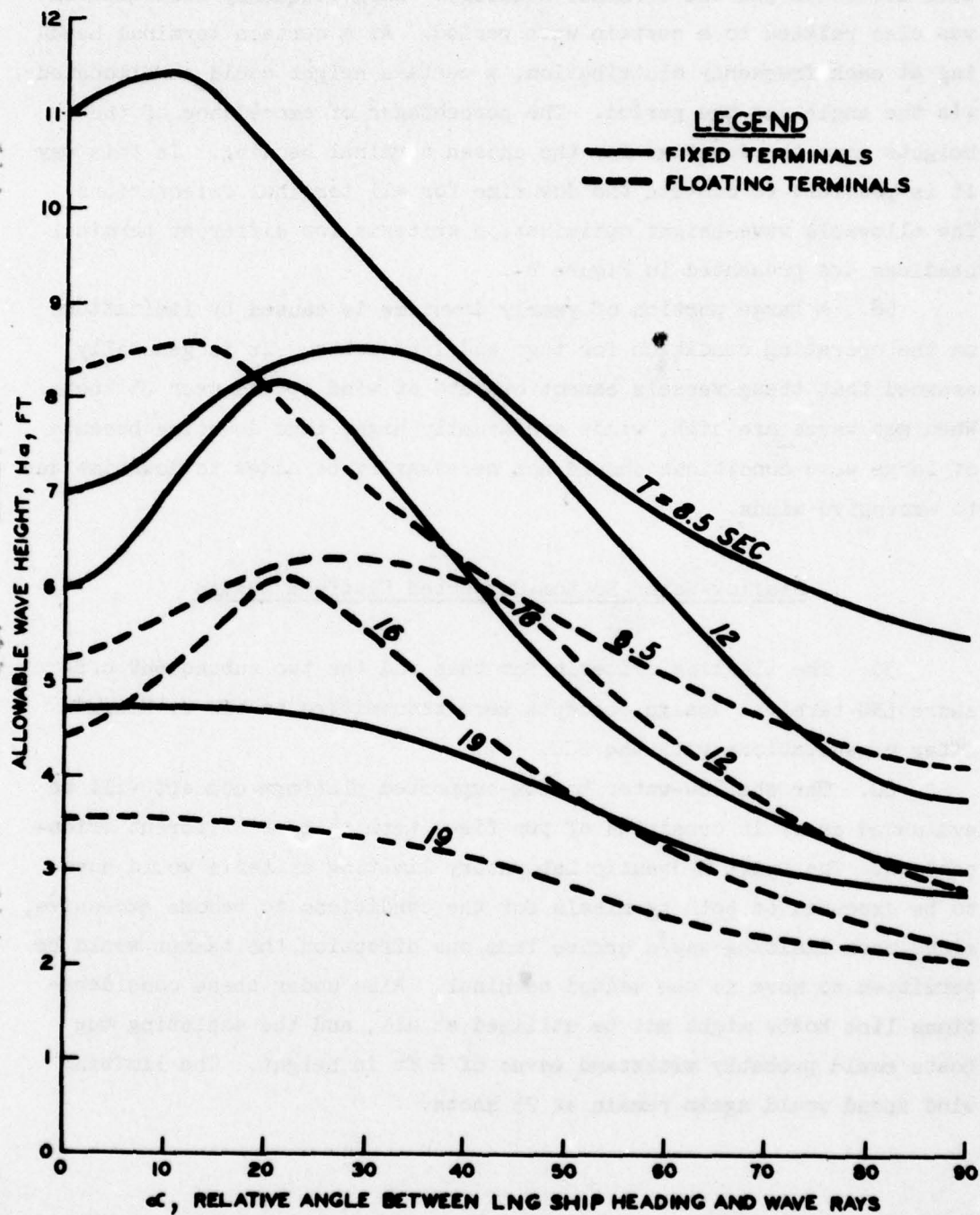


Figure B4. Allowable wave-height optimization criteria, windward side of terminal



### Floating Barge-Type Terminal

61. For the floating barge-type concept of terminal, the short period waves were again considered to be acceptable up to 8 ft in height. The wind speed was also taken as tolerable up to a velocity of 25 knots. However, the mass of the floating barge is such that the natural frequencies are not entirely consistent with those of the LNG tanker. Accordingly, it was determined that this type of facility could probably not withstand long-period waves in excess of 75 percent of those criteria presented by Delft, and these limiting criteria are also presented in Figure B4. The direction is determined by "weathervaning" of the barge in the prevailing wind.

### Deepwater Bottom-Supported Design

62. Because of the stable mooring tower which permits berthing and LNG transfer in more severe wind and wave conditions than could be tolerated alongside a barge or fixed pier, and because the system can also "weathervane," it was determined that sea and swell waves from all directions up to 10.5 ft in height could be tolerated. Also, wind velocities up to 30 knots probably would not be excessive.

## PART VII: RESULTS AND CONCLUSIONS

63. WES was requested to assist in the overall LNG site selection process by applying appropriate refraction and shoaling coefficients to existing deepwater hindcast data for ascertaining the probable wave climate expected at the LNG potential sites. In addition, WES was requested to apply to this expected wave climate certain limiting criteria, depending on the particular terminal concept under consideration at the time, in order to determine the probable percentage exceedance for each concept at each site.

64. In total, four different concepts were considered at each of six potential offshore LNG terminal sites, and these results are presented in tabular form in Tables B9-B43. However, these 24 site/concept combinations do not constitute the entire range of considerations, as a total possible combination of 20 different hybrid concepts could conceivably be evaluated at each potential LNG site. Thus, other factors must be incorporated into the selection process before meaningful decisions can be made regarding the appropriateness of any one concept to any specific site.

65. Beyond the problem of ascertaining the best possible estimate for the sea and swell wave climate, there exist many other problems which are not readily amenable to relatively routine analytical mathematical solutions, but which can be effectively handled by either sophisticated numerical methods, physical model studies, or both. These problems include the moored response of LNG ships to long-period wave energy (25 sec to 6 min), scour and fill near terminal structures, long-term sediment transport, and the stability of protective structures for various wave climates.

66. It should be recognized that this report only includes estimates of the sea and swell wave climate. Little or no quantitative information is available on the long-period wave climate (25 sec to 6 min) variability along the California coast; however, it is known that there are times when the energy in these wave periods is sufficient to cause substantial movement of moored ships. A moored LNG ship has various



frequencies in the 25-sec to 6-min period range at which it is resonant for one or more of the six degrees of freedom; consequently, even very small incident waves (i.e. 0.2 ft) can cause large motions of the ship.

67. Because of the overwhelming importance of, and safety necessary for an LNG terminal, it is extremely important that the best possible design procedures be applied and that sound engineering judgments prevail. Many of the aforementioned phenomena are successfully observed and quantified in hydrodynamically scaled physical models, and the consideration of a complete model testing program is urged for the eventually selected LNG site, regardless of where that site may be.

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Table Bla

Camp Pendleton Potential LNG Terminal Site  
Average Island Sheltering Coefficients

Open Coast Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
170	0.87	0.79	0.77	0.80	0.79	0.78	0.76	0.75
180	0.91	0.87	0.86	0.85	0.85	0.84	0.83	0.83
190	0.93	0.92	0.92	0.91	0.90	0.89	0.88	0.87
200	0.93	0.93	0.92	0.90	0.89	0.87	0.86	0.84
210	0.91	0.90	0.90	0.88	0.86	0.84	0.83	0.81
220	0.89	0.88	0.87	0.85	0.83	0.82	0.80	0.79
230	0.85	0.84	0.83	0.82	0.81	0.80	0.79	0.78
240	0.79	0.78	0.76	0.75	0.73	0.72	0.70	0.69
250	0.75	0.74	0.71	0.70	0.68	0.67	0.66	0.65
260	0.70	0.68	0.66	0.64	0.63	0.62	0.60	0.59
270	0.64	0.61	0.59	0.55	0.54	0.52	0.50	0.48
280	0.56	0.53	0.51	0.49	0.48	0.46	0.45	0.45
290	0.54	0.51	0.50	0.47	0.45	0.43	0.42	0.41
300	0.50	0.48	0.46	0.43	0.42	0.41	0.40	0.39
310	0.42	0.40	0.37	0.33	0.32	0.31	0.30	0.29

Table B1b

Camp Pendleton Potential LNG Terminal Site  
Average Sheltered Deepwater LNG Site Approach Azimuths

Open Ocean Azimuth	Period (sec)							
	<u>5</u>	<u>7</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>17</u>	<u>19</u>
170	190	190	190	190	190	190	190	190
180	190	190	190	190	190	190	190	200
190	200	200	200	200	200	200	200	200
200	200	200	200	200	200	200	200	200
210	200	200	200	200	200	200	200	200
220	210	210	210	210	210	210	210	210
230	220	220	220	220	220	220	220	220
240	230	230	230	230	230	230	230	230
250	240	240	240	240	240	240	240	240
260	250	250	250	250	250	250	250	250
270	260	260	260	260	260	260	260	260
280	270	270	270	270	270	270	270	270
290	280	280	270	270	270	270	270	270
300	280	280	270	270	270	270	270	270
310	290	280	280	280	280	280	280	280

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Table B2a  
Camp Pendleton Potential Offshore LNG Terminal Site  
(Refraction x Shoaling) Coefficients

Sheltered Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
160	0.97	0.78	0.65	0.75	0.72	0.81	0.72	0.73
180	0.97	0.88	0.84	0.87	0.92	0.96	1.03	1.08
200	0.97	0.91	0.90	0.93	0.98	1.03	1.08	1.13
220	0.97	0.92	0.92	0.97	1.03	1.10	1.19	1.28
240	0.97	0.92	0.92	0.98	1.03	1.10	1.16	1.26
260	0.97	0.91	0.90	0.93	1.01	1.12	1.26	1.40
280	0.97	0.88	0.83	0.84	0.86	0.92	1.07	1.34
300	0.97	0.70	0.63	0.65	0.57	0.74	0.86	0.80
310	0.97	0.61	0.53	0.55	0.42	0.65	0.75	0.53

Table B2b  
Camp Pendleton Potential Offshore LNG Terminal Site  
LNG Site Approach Azimuths

Sheltered Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
160	160	170	180	190	200	200 "	200	200
180	180	190	190	200	200	210	210	210
200	200	200	210	210	210	210	220	220
220	220	220	220	220	220	220	220	220
240	240	240	240	240	240	230	230	230
260	260	260	250	250	250	240	240	240
280	280	270	270	260	260	250	250	250
300	300	290	280	270	260	260	260	250
310	310	300	290	280	270	260	250	250



Table B3a

Bechers Bay Potential Offshore LNG Terminal Site(Refraction x Shoaling) Coefficients

<u>Deepwater Azimuth</u>	<u>Period (sec)</u>							
	<u>5</u>	<u>7</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>17</u>	<u>19</u>
337.5	0.64	0.63	0.64	0.56	0.60	0.55	0.62	0.69
0.0	0.96	0.90	1.08	1.08	0.83	0.92	0.93	1.02
22.5	0.97	0.89	0.93	-	-	-	-	-
45.0	0.97	0.94	0.97	-	-	-	-	-
67.5	0.97	0.90	0.86	-	-	-	-	-
90.0	0.95	0.85	0.77	-	-	-	-	-
112.5	0.22	0.24	0.66	0.65	-	-	-	-

Table B3b

Bechers Bay Potential Offshore LNG Terminal SiteLNG Site Approach Azimuths

<u>Deepwater Azimuth</u>	<u>Period (sec)</u>							
	<u>5</u>	<u>7</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>17</u>	<u>19</u>
337.5	337.5	0.0	0.0	0.0	0.0	0.0	22.5	22.5
0.0	0.0	0.0	0.0	22.5	22.5	22.5	22.5	22.5
22.5	22.5	22.5	22.5	-	-	-	-	-
45.0	45.0	45.0	45.0	-	-	-	-	-
67.5	67.5	67.5	67.5	-	-	-	-	-
90.0	90.0	67.5	67.5	-	-	-	-	-
112.5	112.5	90.0	90.0	90.0	-	-	-	-

Table B4a

Chinese Harbor Potential Offshore LNG Terminal Site

(Refraction x Shoaling) Coefficient

<u>Deepwater Azimuth</u>	<u>Period (sec)</u>							
	<u>4</u>	<u>7</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>17</u>	<u>19</u>
242.5	1.00	0.99	0.70	0.58	0.49	0.46	0.46	0.49
315.0	1.00	0.99	0.94	0.91	0.89	1.20	1.03	0.93
337.5	1.00	0.99	0.95	0.93	0.96	0.94	0.83	0.83
0.0	1.00	0.99	0.94	0.91	0.90	0.90	0.92	0.92
22.5	1.00	0.99	0.93	0.83	0.81	0.78	0.84	0.84
45.0	1.00	0.93	0.68	0.58	0.59	0.61	0.67	0.69

Table B4b

Chinese Harbor Potential Offshore LNG Terminal SiteLNG Site Approach Azimuths

<u>Deepwater Azimuth</u>	<u>Period (sec)</u>							
	<u>5</u>	<u>7</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>17</u>	<u>19</u>
292.5	292.5	292.5	292.5	292.5	315.0	315.0	315.0	315.0
315.0	315.0	315.0	315.0	315.0	315.0	315.0	337.5	337.5
337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.5	22.5	22.5	22.5	22.5	22.5	22.5	0.0	0.0
45.0	45.0	45.0	45.0	22.5	22.5	22.5	22.5	22.5

Table B5a

Smugglers Cove Potential Offshore LNG Terminal Site(Refraction x Shoaling) CoefficientsDepth = 50 ft

Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
0.0	0.10	0.15	0.20	-	-	-	-	-
22.5	0.25	0.35	0.45	-	-	-	-	-
45.0	0.74	0.54	0.52	-	-	-	-	-
67.5	0.94	0.76	0.73	-	-	-	-	-
90.0	0.97	0.88	0.85	-	-	-	-	-
112.5	0.97	0.90	1.02	1.11	-	-	-	-
135.0	0.97	0.90	0.87	0.82	0.85	0.96	-	-
157.5	0.97	0.86	0.86	0.96	1.12	1.06	1.14	1.08
180.0	0.97	0.82	0.88	0.93	1.08	0.99	1.07	1.10
202.5	0.73	0.66	0.66	0.79	0.84	0.82	0.99	1.00
225.0	0.31	0.36	0.31	0.85	0.71	0.68	0.64	0.59
247.5	0.25	0.27	0.25	0.44	0.55	0.53	0.51	0.45



Table B5b

Smugglers Cove Potential Offshore LNG Terminal SiteLNG Site Approach AzimuthsDepth = 50 ft

Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
0.0	67.5	67.5	67.5	-	-	-	-	-
22.5	67.5	67.5	67.5	-	-	-	-	-
45.0	67.5	67.5	67.5	-	-	-	-	-
67.5	67.5	90.0	90.0	-	-	-	-	-
90.0	90.0	90.0	90.0	-	-	-	-	-
112.5	112.5	112.5	112.5	112.5	-	-	-	-
135.0	135.0	135.0	135.0	135.0	135.0	135.0	-	-
157.5	157.5	157.5	135.0	135.0	135.0	135.0	135.0	135.0
180.0	180.0	180.0	157.5	157.5	157.5	157.5	157.5	157.5
202.5	202.5	180.0	180.0	180.0	157.5	157.5	157.5	157.5
225.0	202.5	180.0	180.0	180.0	180.0	180.0	180.0	180.0
247.5	225.0	202.5	180.0	180.0	180.0	180.0	180.0	180.0

Table B6a

Smugglers Cove Potential Offshore LNG Terminal Site

(Refraction x Shoaling) Coefficient

Depth = 120 ft

Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
0.0	1.00	0.70	0.60	-	-	-	-	-
22.5	1.00	0.99	0.83	-	-	-	-	-
45.0	1.00	0.99	0.93	-	-	-	-	-
67.5	1.00	0.99	0.95	-	-	-	-	-
90.0	1.00	0.99	0.97	-	-	-	-	-
112.5	1.00	0.99	1.01	1.08	-	-	-	-
135.0	1.00	0.99	0.95	0.87	0.79	0.78	-	-
157.5	1.00	0.99	0.93	0.89	0.96	1.27	1.19	1.20
180.0	1.00	0.94	0.84	0.80	0.81	0.80	0.84	0.88
202.5	1.00	0.97	0.82	0.78	0.76	0.72	0.66	0.74
225.0	0.93	0.88	0.66	0.67	0.60	0.60	0.58	0.65
247.5	0.55	0.63	0.55	0.63	0.60	0.40	0.25	0.30

Table B6b

Smugglers Cove Potential Offshore LNG Terminal SiteLNG Site Approach AzimuthsDepth = 120 ft

Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
0.0	0.0	0.0	-	-	-	-	-	-
22.5	22.5	22.5	22.5	-	-	-	-	-
45.0	45.0	45.0	45.0	-	-	-	-	-
67.5	67.5	67.5	67.5	-	-	-	-	-
90.0	90.0	90.0	90.0	-	-	-	-	-
112.5	112.5	112.5	112.5	112.5	-	-	-	-
135.0	135.0	135.0	135.0	135.0	135.0	135.0	-	-
157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5
180.0	180.0	180.0	180.0	180.0	180.0	180.0	157.5	157.5
202.5	202.5	202.5	202.5	180.0	180.0	180.0	180.0	180.0
225.0	225.0	225.0	202.5	202.5	180.0	180.0	180.0	180.0
247.5	225.0	225.0	225.0	225.0	225.0	202.5	202.5	180.0



Table B7a

East Channel Shelf Potential Offshore LNG Terminal Site(Refraction x Shoaling) Coefficient

Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
0.0	1.00	1.00	1.00	-	-	-	-	-
22.5	1.00	1.00	1.00	-	-	-	-	-
45.0	1.00	1.00	1.00	-	-	-	-	-
67.5	1.00	1.00	1.00	-	-	-	-	-
90.0	1.00	1.00	1.00	-	-	-	-	-
112.5	1.00	1.00	1.00	-	-	-	-	-
135.0	1.00	1.00	1.00	0.99	0.97	0.93	1.02	1.06
157.5	1.00	1.00	1.00	-	-	-	-	-
180.0	1.00	1.00	1.00	-	-	-	-	-
202.5	1.00	1.00	1.00	-	-	-	-	-
225.0	1.00	1.00	1.00	-	-	-	-	-
247.5	1.00	1.00	1.00	0.99	0.98	1.04	0.99	1.05
270.0	1.00	1.00	1.00	0.99	0.96	0.90	0.85	0.80
292.5	1.00	1.00	1.00	0.99	0.92	0.87	0.86	0.89
315.0	1.00	1.00	1.00	-	-	-	-	-
337.5	1.00	1.00	1.00	-	-	-	-	-

Table B7b

East Channel Shelf Potential Offshore LNG Terminal SiteLNG Site Approach Azimuths

Deepwater Azimuth	Period (sec)							
	5	7	9	11	13	15	17	19
0.0	0.0	0.0	0.0	-	-	-	-	-
22.5	22.5	22.5	22.5	-	-	-	-	-
45.0	45.0	45.0	45.0	-	-	-	-	-
67.5	67.5	67.5	67.5	-	-	-	-	-
90.0	90.0	90.0	90.0	-	-	-	-	-
112.5	112.5	112.5	112.5					
135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
157.5	157.5	157.5	157.5	-	-	-	-	-
180.0	180.0	180.0	180.0	-	-	-	-	-
202.5	202.5	202.5	202.5	-	-	-	-	-
225.0	225.0	225.0	225.0	-	-	-	-	-
247.5	247.5	247.5	247.5	247.5	247.5	247.5	247.5	247.5
270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0
292.5	292.5	292.5	292.5	292.5	292.5	292.5	292.5	292.5
315.0	315.0	315.0	315.0	-	-	-	-	-
337.5	337.5	337.5	337.5	-	-	-	-	-

Table B8  
Potential Offshore LNG Terminal Sites Frequencies  
of Wind Velocities

<u>Month</u>	<u>Percent* Greater Than</u>	
	<u>25 Knots</u>	<u>30 Knots</u>
<u>Central Santa Barbara Channel</u>		
Jan	1.60	0.47
Feb	1.47	0.30
Mar	3.41	1.16
Apr	1.48	0.47
May	1.27	0.15
Jun	0.51	0.10
Jul	0.49	0.10
Aug	0.25	0.00
Sep	0.35	0.00
Oct	0.78	0.22
Nov	1.87	0.28
Dec	3.88	0.97
Annual	1.45	0.35
<u>Smugglers Cove</u>		
Jan	5.65	3.11
Feb	6.56	2.39
Mar	9.70	3.36
Apr	9.87	3.16
May	8.97	4.61
Jun	7.39	2.30
Jul	1.36	0.34
Aug	1.65	0.35
Sep	2.45	0.65
Oct	2.68	0.57
Nov	4.27	1.27
Dec	4.58	1.95
Annual	5.43	2.01
<u>Camp Pendleton</u>		
Jan	1.51	0.21
Feb	2.66	0.71
Mar	1.32	0.19
Apr	0.80	0.20
May	0.16	0.00
Jun	0.19	0.00
(Continued)		

\* Percent of month greater than, except annual is percent of year greater than.



Table B8 (Concluded)

<u>Month</u>	<u>Percent Greater Than</u>	
	<u>25 Knots</u>	<u>30 Knots</u>
<u>Camp Pendleton (Continued)</u>		
Jul	0.00	0.00
Aug	0.12	0.00
Sep	0.18	0.00
Oct	0.53	0.00
Nov	1.09	0.43
Dec	0.78	0.00
Annual	0.78	0.15

Table B9

Smugglers Cove 50-Ft DepthPotential Offshore LNG Terminal Site6-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.03	0.08	0.00	0.04	0.15
Feb	0.27	0.16	0.00	0.14	0.57
Mar	0.03	0.00	0.00	0.04	0.07
Apr	0.03	0.00	0.00	0.02	0.05
May	0.00	0.00	0.00	0.02	0.02
Jun	0.00	0.00	0.00	0.04	0.04
Jul	0.00	0.00	0.00	0.01	0.01
Aug	0.00	0.00	0.00	0.02	0.02
Sep	0.00	0.00	0.00	0.01	0.01
Oct	0.00	0.00	0.00	0.01	0.01
Nov	0.00	0.00	0.00	0.09	0.09
Dec	0.03	0.00	0.00	0.11	0.14
Annual	0.39	0.24	0.00	0.55	1.18

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\* One fixed berth.

Table B10  
Smugglers Cove 50-Ft Depth  
Potential Offshore LNG Terminal Site  
8-Ft Maximum Allowable Height Criteria  
Percent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.01	0.01	0.00	0.01	0.03
Feb	0.14	0.04	0.00	0.03	0.21
Mar	0.01	0.00	0.00	0.00	0.01
Apr	0.01	0.00	0.00	0.00	0.01
May	0.00	0.00	0.00	0.01	0.01
Jun	0.00	0.00	0.00	0.01	0.01
Jul	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.01	0.01
Sep	0.00	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.02	0.02
Dec	0.01	0.00	0.00	0.02	0.03
Annual	0.18	0.05	0.00	0.11	0.34

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\* Two fixed or floating barge-type terminals.



Table B11

Smugglers Cove 50-Ft DepthPotential Offshore LNG Terminal Site10.5-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.00	0.00	0.00	0.00
Feb	0.04	0.00	0.00	0.01	0.05
Mar	0.00	0.00	0.00	0.00	0.00
Apr	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.01	0.01
Jun	0.00	0.00	0.00	0.01	0.01
Jul	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.01	0.01
Dec	0.00	0.00	0.00	0.00	0.00
Annual	0.04	0.00	0.00	0.04	0.08

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\* Single mooring tower.

Table B12

Smugglers Cove 50-Ft DepthPotential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.01	0.06	0.00	0.02	0.09
Feb	0.11	0.11	0.00	0.00	0.22
Mar	0.01	0.00	0.00	0.01	0.02
Apr	0.01	0.00	0.00	0.00	0.01
May	0.00	0.00	0.00	0.01	0.01
Jun	0.00	0.00	0.00	0.01	0.01
Jul	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.01	0.01
Dec	0.01	0.00	0.00	0.00	0.01
Annual	0.15	0.17	0.00	0.06	0.38

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\* One fixed berth ( $\theta = 190^\circ$ ).

Table B13

Smugglers Cove 50-Ft DepthPotential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.04	0.00	0.02	0.06
Feb	0.03	0.08	0.00	0.00	0.11
Mar	0.00	0.00	0.00	0.01	0.01
Apr	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.01	0.01
Jun	0.00	0.00	0.00	0.01	0.01
Jul	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.01	0.01
Dec	0.00	0.00	0.00	0.00	0.00
Annual	0.03	0.12	0.00	0.06	0.21

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\* Two fixed berths ( $\theta_1 = 130^\circ$ ,  $\theta_2 = 200^\circ$ ). Criteria exceeded at both berths.



Table B14  
Smugglers Cove 50-Ft Depth  
Potential Offshore LNG Terminal Site  
75 Percent of Delft Optimization Criteria  
Percent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.13	0.38	0.00	0.01	0.52
Feb	0.18	0.61	0.00	0.05	0.84
Mar	0.05	0.19	0.00	0.01	0.25
Apr	0.04	0.08	0.00	0.00	0.12
May	0.01	0.10	0.11	0.01	0.23
Jun	0.00	0.00	0.04	0.01	0.05
Jul	0.00	0.00	0.24	0.00	0.24
Aug	0.00	0.05	0.20	0.00	0.25
Sep	0.00	0.11	0.16	0.00	0.27
Oct	0.00	0.03	0.10	0.00	0.13
Nov	0.01	0.00	0.00	0.02	0.03
Dec	0.02	0.06	0.00	0.02	0.10
Annual	0.44	1.61	0.85	0.13	3.03

\* Floating barge-type terminal. Direction determined by weathervaning of barge in prevailing winds.

Table B15

Smugglers Cove 120-Ft DepthPotential Offshore LNG Terminal Site6-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.14	0.15	0.00	0.13	0.42
Feb	0.35	0.39	0.00	0.24	0.98
Mar	0.05	0.03	0.00	0.17	0.25
Apr	0.05	0.04	0.00	0.13	0.22
May	0.00	0.00	0.00	0.11	0.11
Jun	0.00	0.00	0.00	0.12	0.12
Jul	0.00	0.00	0.00	0.05	0.05
Aug	0.00	0.00	0.00	0.06	0.06
Sep	0.00	0.01	0.00	0.05	0.06
Oct	0.00	0.00	0.00	0.04	0.04
Nov	0.09	0.00	0.00	0.11	0.20
Dec	0.02	0.00	0.00	0.16	0.18
Annual	0.70	0.63	0.00	1.37	2.70

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\* One fixed berth.

Table B16  
Smugglers Cove 120-Ft Depth  
Potential Offshore LNG Terminal Site  
8-Ft Maximum Allowable Height Criteria  
Percent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.02	0.03	0.00	0.04	0.09
Feb	0.19	0.13	0.00	0.06	0.38
Mar	0.01	0.00	0.00	0.06	0.07
Apr	0.00	0.01	0.00	0.02	0.03
May	0.00	0.00	0.00	0.04	0.04
Jun	0.00	0.00	0.00	0.03	0.03
Jul	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.02	0.02
Sep	0.00	0.00	0.00	0.02	0.02
Oct	0.00	0.00	0.00	0.01	0.01
Nov	0.01	0.00	0.00	0.03	0.04
Dec	0.01	0.00	0.00	0.04	0.05
Annual	0.24	0.17	0.00	0.37	0.78

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\* Two fixed or floating barge-type terminals.



Table B17

Smugglers Cove 120-Ft DepthPotential Offshore LNG Terminal Site10.5-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.01	0.00	0.02	0.03
Feb	0.06	0.01	0.00	0.03	0.10
Mar	0.00	0.00	0.00	0.03	0.03
Apr	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.02	0.02
Jun	0.00	0.00	0.00	0.02	0.02
Jul	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.01	0.01
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.01	0.01
Dec	0.00	0.00	0.00	0.00	0.00
Annual	0.06	0.02	0.00	0.14	0.22

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\* Single mooring tower.

Table B18

Smugglers Cove 120-Ft DepthPotential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.10	0.03	0.00	0.03	0.16
Feb	0.17	0.14	0.00	0.02	0.33
Mar	0.04	0.00	0.00	0.03	0.07
Apr	0.03	0.01	0.00	0.00	0.04
May	0.01	0.00	0.00	0.02	0.03
Jun	0.00	0.00	0.00	0.02	0.02
Jul	0.00	0.00	0.01	0.00	0.01
Aug	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.01	0.01
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.06	0.00	0.00	0.01	0.07
Dec	0.02	0.00	0.00	0.00	0.02
Annual	0.43	0.18	0.01	0.14	0.76

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\* One fixed berth ( $\theta = 200^\circ$ ).

Table B19

Smugglers Cove 120-Ft DepthPotential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.04	0.03	0.00	0.03	0.10
Feb	0.06	0.14	0.00	0.02	0.22
Mar	0.01	0.00	0.00	0.03	0.04
Apr	0.01	0.01	0.00	0.00	0.02
May	0.00	0.00	0.00	0.02	0.02
Jun	0.00	0.00	0.00	0.02	0.02
Jul	0.00	0.00	0.01	0.00	0.01
Aug	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.01	0.01
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.02	0.00	0.00	0.01	0.03
Dec	0.01	0.00	0.01	0.00	0.02
Annual	0.15	0.18	0.01	0.14	0.48

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\* Two fixed berths ( $\theta_1 = 45^\circ$ ,  $\theta_2 = 200^\circ$ ). Criteria exceeded at both berths.



Table B20

Smugglers Cove 120-Ft DepthPotential Offshore LNG Terminal Site75 Percent of Delft Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.19	0.61	0.00	0.02	0.82
Feb	0.32	0.99	0.00	0.07	1.38
Mar	0.07	0.24	0.00	0.03	0.34
Apr	0.06	0.12	0.00	0.00	0.18
May	0.02	0.09	0.17	0.02	0.30
Jun	0.00	0.00	0.07	0.02	0.09
Jul	0.00	0.00	0.46	0.00	0.46
Aug	0.00	0.00	0.36	0.01	0.37
Sep	0.00	0.07	0.28	0.01	0.36
Oct	0.00	0.02	0.19	0.00	0.21
Nov	0.11	0.00	0.00	0.02	0.13
Dec	0.04	0.08	0.00	0.02	0.14
Annual	0.81	2.22	1.53	0.22	4.78

\* Floating barge-type terminal. Direction determined by weathervaning of barge in prevailing winds.

Table B21

Camp Pendleton Potential Offshore LNG Terminal Site6-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.25	0.0	0.00	0.1	0.35
Feb	0.25	0.0	0.00	0.2	0.45
Mar	0.42	0.0	0.00	0.1	0.52
Apr	0.42	0.0	0.00	0.1	0.52
May	0.76	0.0	0.01	0.0	0.77
Jun	0.92	0.0	0.00	0.0	0.92
Jul	0.42	0.0	0.03	0.0	0.45
Aug	0.25	0.0	0.03	0.0	0.28
Sep	0.17	0.0	0.03	0.0	0.20
Oct	0.08	0.0	0.01	0.0	0.09
Nov	0.08	0.0	0.00	0.1	0.18
Dec	0.17	0.0	0.00	0.0	0.17
Annual	4.20	0.0	0.10	0.6	4.90

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\* One fixed berth.

Table B22

Camp Pendleton Potential Offshore LNG Terminal Site8-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.11	0.0	0.0	0.00	0.11
Feb	0.06	0.0	0.0	0.06	0.12
Mar	0.07	0.0	0.0	0.02	0.09
Apr	0.06	0.0	0.0	0.02	0.08
May	0.11	0.0	0.0	0.00	0.11
Jun	0.13	0.0	0.0	0.00	0.13
Jul	0.02	0.0	0.0	0.00	0.02
Aug	0.02	0.0	0.0	0.00	0.02
Sep	0.02	0.0	0.0	0.00	0.02
Oct	0.02	0.0	0.0	0.00	0.02
Nov	0.03	0.0	0.0	0.02	0.05
Dec	0.05	0.0	0.0	0.00	0.05
Annual	0.70	0.0	0.0	0.12	0.82

---

\* Two fixed berths or floating barge-type terminal.



Table B23

Camp Pendleton Potential Offshore LNG Terminal Site10.5-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.0	0.0	0.0	0.0	0.0
Feb	0.0	0.0	0.0	0.0	0.0
Mar	0.0	0.0	0.0	0.0	0.0
Apr	0.0	0.0	0.0	0.0	0.0
May	0.0	0.0	0.0	0.0	0.0
Jun	0.0	0.0	0.0	0.0	0.0
Jul	0.0	0.0	0.0	0.0	0.0
Aug	0.0	0.0	0.0	0.0	0.0
Sep	0.0	0.0	0.0	0.0	0.0
Oct	0.0	0.0	0.0	0.0	0.0
Nov	0.0	0.0	0.0	0.0	0.0
Dec	0.0	0.0	0.0	0.0	0.0
Annual	0.0	0.0	0.0	0.0	0.0

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\* Single mooring tower.

Table B24

Camp Pendleton Potential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.02	0.01	0.00	0.01	0.04
Feb	0.02	0.01	0.00	0.01	0.04
Mar	0.04	0.02	0.00	0.01	0.07
Apr	0.04	0.00	0.00	0.01	0.05
May	0.07	0.00	0.39	0.02	0.48
Jun	0.09	0.00	0.18	0.02	0.29
Jul	0.04	0.00	0.81	0.01	0.86
Aug	0.02	0.00	0.58	0.01	0.61
Sep	0.02	0.00	0.62	0.00	0.64
Oct	0.01	0.00	0.14	0.00	0.15
Nov	0.01	0.00	0.00	0.00	0.01
Dec	0.02	0.00	0.00	0.00	0.02
Annual	0.40	0.04	2.72	0.10	3.26

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\* One fixed berth ( $\theta = 280^\circ$ ).

Table B25

Camp Pendleton Potential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.01	0.00	0.00	0.00	0.01
Feb	0.01	0.00	0.00	0.00	0.01
Mar	0.01	0.00	0.00	0.00	0.01
Apr	0.01	0.00	0.00	0.00	0.01
May	0.02	0.00	0.01	0.00	0.03
Jun	0.02	0.00	0.01	0.00	0.03
Jul	0.01	0.00	0.03	0.00	0.04
Aug	0.00	0.00	0.02	0.00	0.02
Sep	0.00	0.00	0.02	0.00	0.02
Oct	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.00	0.00	0.00
Annual	0.09	0.00	0.09	0.00	0.18

\* Two fixed berths ( $\theta_1 = 210^\circ$ ,  $\theta_2 = 280^\circ$ ). Criteria exceeded at both berths.



Table B26

Camp Pendleton Potential Offshore LNG Terminal Site75 Percent of Delft Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Southern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.06	0.03	0.00	0.00	0.09
Feb	0.07	0.02	0.00	0.00	0.09
Mar	0.10	0.07	0.00	0.00	0.17
Apr	0.11	0.02	0.00	0.00	0.13
May	0.17	0.00	0.52	0.00	0.69
Jun	0.21	0.00	0.25	0.00	0.46
Jul	0.08	0.00	1.08	0.00	1.16
Aug	0.05	0.00	0.78	0.00	0.83
Sep	0.04	0.00	0.81	0.00	0.85
Oct	0.03	0.00	0.18	0.00	0.21
Nov	0.03	0.01	0.00	0.00	0.04
Dec	0.04	0.02	0.00	0.00	0.06
Annual	0.99	0.17	3.62	0.00	4.78

\* Floating barge-type terminal. Direction determined by weathervaning of barge in prevailing winds.

Table B27

East Channel Shelf Potential Offshore LNG Terminal Site6-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>National Marine Consultants</u>			<u>SSMO Data Tapes</u>		
	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>
Jan	0.78	0.92	1.70	0.36	1.97	2.33
Feb	1.36	2.09	3.45	0.40	1.47	1.87
Mar	1.34	1.11	2.45	0.34	1.23	1.57
Apr	1.55	1.30	2.85	0.28	1.50	1.78
May	0.88	0.55	1.43	0.53	0.53	1.06
Jun	0.98	1.04	2.02	0.26	0.00	0.26
Jul	0.57	0.17	0.74	0.10	0.44	0.54
Aug	0.34	0.22	0.56	0.25	0.50	0.75
Sep	0.33	0.05	0.38	0.20	0.00	0.20
Oct	0.63	0.38	1.01	0.34	0.55	0.89
Nov	0.63	0.41	1.04	0.10	0.66	0.76
Dec	0.56	0.55	1.11	0.43	0.82	1.25
Annual	9.95	8.79	18.74	3.60	9.70	13.30

\* One fixed berth.

Table B28

East Channel Shelf Potential Offshore LNG Terminal Site8-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>National Marine Consultants</u>			<u>SSMO Data Tapes</u>		
	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>
Jan	0.32	0.41	0.73	0.12	0.92	1.04
Feb	0.68	1.16	1.84	0.13	0.76	0.89
Mar	0.48	0.54	1.02	0.22	0.45	0.67
Apr	0.58	0.74	1.32	0.00	0.00	0.00
May	0.28	0.05	0.33	0.50	0.00	0.50
Jun	0.16	0.30	0.46	0.00	0.00	0.00
Jul	0.03	0.01	0.04	0.00	0.00	0.00
Aug	0.05	0.02	0.07	0.00	0.00	0.00
Sep	0.06	0.00	0.06	0.00	0.00	0.00
Oct	0.13	0.06	0.19	0.11	0.00	0.11
Nov	0.18	0.17	0.35	0.00	0.47	0.47
Dec	0.15	0.16	0.31	0.14	0.00	0.14
Annual	3.10	3.62	6.72	1.20	2.60	3.80

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\* Two fixed berths or floating barge-type terminals.



Table B29

East Channel Shelf Potential Offshore LNG Terminal Site10.5-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>National Marine Consultants</u>			<u>SSMO Data Tapes</u>		
	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>
Jan	0.04	0.17	0.21	0.00	0.42	0.42
Feb	0.30	0.44	0.74	0.00	0.68	0.68
Mar	0.09	0.17	0.26	0.04	0.10	0.14
Apr	0.11	0.31	0.42	0.00	0.00	0.00
May	0.02	0.01	0.03	0.08	0.00	0.08
Jun	0.01	0.03	0.04	0.00	0.00	0.00
Jul	0.00	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.08	0.00	0.08
Nov	0.01	0.05	0.06	0.00	0.00	0.00
Dec	0.01	0.02	0.03	0.00	0.00	0.00
Annual	0.59	1.20	1.79	0.20	1.20	1.40

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\* Single mooring tower.

Table B30

East Channel Shelf Potential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>National Marine Consultants</u>			<u>SSMO Data Tapes</u>		
	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>
Jan	0.45	0.51	0.96	0.30	0.45	0.75
Feb	0.84	1.14	1.98	0.56	1.00	1.56
Mar	0.54	0.51	1.05	0.36	0.45	0.81
Apr	0.43	0.76	1.19	0.28	0.67	0.95
May	0.18	0.06	0.24	0.12	0.05	0.17
Jun	0.03	0.29	0.32	0.02	0.26	0.28
Jul	0.00	0.01	0.01	0.00	0.01	0.01
Aug	0.00	0.02	0.02	0.00	0.02	0.02
Sep	0.00	0.00	0.00	0.00	0.00	0.00
Oct	0.13	0.07	0.20	0.09	0.06	0.15
Nov	0.03	0.21	0.24	0.02	0.18	0.20
Dec	0.24	0.19	0.43	0.16	0.17	0.33
Annual	2.87	3.77	6.64	1.91	3.32	5.23

\* One fixed berth ( $\theta = 270^\circ$ ).

Table B31

East Channel Shelf Potential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>National Marine Consultants</u>			<u>SSMO Data Tapes</u>		
	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>
Jan	0.07	0.51	0.58	0.23	0.45	0.68
Feb	0.35	1.14	1.49	0.43	1.00	1.43
Mar	0.14	0.51	0.65	0.27	0.45	0.72
Apr	0.20	0.76	0.96	0.21	0.67	0.88
May	0.07	0.06	0.13	0.09	0.05	0.14
Jun	0.03	0.29	0.32	0.02	0.26	0.28
Jul	0.00	0.01	0.01	0.00	0.01	0.01
Aug	0.00	0.02	0.02	0.00	0.02	0.02
Sep	0.00	0.00	0.00	0.00	0.00	0.00
Oct	0.00	0.07	0.07	0.07	0.06	0.13
Nov	0.03	0.21	0.24	0.02	0.18	0.20
Dec	0.05	0.19	0.24	0.12	0.17	0.29
Annual	0.94	3.77	4.71	1.45	3.32	4.77

\* Two fixed berths ( $\theta_1 = 135^\circ$ ,  $\theta_2 = 270^\circ$ ). Criteria exceeded at both berths.



Table B32

East Channel Shelf Potential Offshore LNG Terminal Site75 Percent of Delft Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>National Marine Consultants</u>			<u>SSMO Data Tapes</u>		
	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>	<u>Sea</u>	<u>Northern Swell</u>	<u>Total</u>
Jan	0.55	0.75	1.30	0.30	0.38	0.68
Feb	0.78	1.10	1.88	0.26	0.97	1.23
Mar	0.92	0.75	1.67	0.35	0.65	1.00
Apr	1.02	0.70	1.72	0.26	0.61	0.87
May	0.53	0.48	1.01	0.24	0.30	0.54
Jun	0.56	0.89	1.45	0.33	0.49	0.82
Jul	0.43	0.36	0.79	0.18	0.36	0.54
Aug	0.31	0.47	0.78	0.20	0.40	0.60
Sep	0.32	0.11	0.43	0.17	0.61	0.78
Oct	0.42	0.42	0.84	0.23	0.45	0.68
Nov	0.36	0.29	0.65	0.18	0.38	0.56
Dec	0.35	0.35	0.70	0.24	0.35	0.59
Annual	6.55	6.67	13.22	2.94	5.95	8.89

\* Floating barge-type terminal. Direction determined by weathervaning of barge in prevailing winds.

Table B33

Chinese Harbor Potential Offshore LNG Terminal Site6-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.24	1.00	0.12	1.36
Feb	0.44	1.76	0.11	2.31
Mar	0.50	0.91	0.25	1.66
Apr	0.50	1.23	0.13	1.86
May	0.23	0.10	0.14	0.47
Jun	0.54	0.47	0.08	1.09
Jul	0.29	0.02	0.09	0.40
Aug	0.20	0.06	0.03	0.29
Sep	0.17	0.00	0.06	0.23
Oct	0.29	0.14	0.04	0.47
Nov	0.31	0.24	0.13	0.68
Dec	0.23	0.71	0.25	1.19
Annual	3.94	6.64	1.43	12.01

---

\* One fixed berth.

Table B34

Chinese Harbor Potential Offshore LNG Terminal Site8-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.03	0.28	0.01	0.32
Feb	0.04	0.75	0.01	0.80
Mar	0.00	0.44	0.05	0.49
Apr	0.01	0.55	0.02	0.58
May	0.00	0.03	0.01	0.04
Jun	0.00	0.09	0.01	0.10
Jul	0.01	0.00	0.00	0.01
Aug	0.02	0.00	0.00	0.02
Sep	0.00	0.00	0.00	0.00
Oct	0.01	0.01	0.00	0.02
Nov	0.03	0.06	0.01	0.10
Dec	0.02	0.20	0.04	0.26
Annual	0.17	2.42	0.16	2.75

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\* Two fixed berths or floating barge-type terminal.



Table B35

Chinese Harbor Potential Offshore LNG Terminal Site10.5-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.07	0.00	0.07
Feb	0.00	0.22	0.00	0.22
Mar	0.00	0.21	0.01	0.22
Apr	0.00	0.22	0.00	0.22
May	0.00	0.00	0.00	0.00
Jun	0.00	0.00	0.00	0.00
Jul	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.00
Nov	0.00	0.02	0.00	0.02
Dec	0.00	0.02	0.02	0.04
Annual	0.00	0.76	0.03	0.79

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\* Single mooring tower.

Table B36

Chinese Harbor Potential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.22	0.02	0.24
Feb	0.00	0.23	0.02	0.25
Mar	0.00	0.15	0.00	0.15
Apr	0.00	0.16	0.00	0.16
May	0.00	0.17	0.00	0.17
Jun	0.00	0.10	0.00	0.10
Jul	0.00	0.10	0.00	0.10
Aug	0.00	0.12	0.00	0.12
Sep	0.00	0.15	0.00	0.15
Oct	0.00	0.17	0.00	0.17
Nov	0.00	0.21	0.01	0.22
Dec	0.00	0.21	0.00	0.21
Annual	0.00	1.99	0.05	2.04

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\* One fixed berth ( $\theta = 300^\circ$ ).

Table B37

Chinese Harbor Potential Offshore LNG Terminal SiteDelft Hydraulics Laboratory Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.22	0.00	0.22
Feb	0.00	0.23	0.00	0.23
Mar	0.00	0.15	0.00	0.15
Apr	0.00	0.16	0.00	0.16
May	0.00	0.17	0.00	0.17
Jun	0.00	0.10	0.00	0.10
Jul	0.00	0.10	0.00	0.10
Aug	0.00	0.12	0.00	0.12
Sep	0.00	0.15	0.00	0.15
Oct	0.00	0.17	0.00	0.17
Nov	0.00	0.21	0.00	0.21
Dec	0.00	0.21	0.00	0.21
Annual	0.00	1.99	0.00	1.99

\* Two fixed berths ( $\theta_1 = 290^\circ$ ,  $\theta_2 = 360^\circ$ ). Criteria exceeded at both berths.



Table B38

Chinese Harbor Potential Offshore LNG Terminal Site75 Percent of Delft Optimization CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.01	0.90	0.03	0.94
Feb	0.02	0.82	0.02	0.86
Mar	0.02	0.66	0.06	0.74
Apr	0.02	0.51	0.02	0.55
May	0.01	0.41	0.01	0.43
Jun	0.03	0.56	0.01	0.60
Jul	0.01	0.23	0.00	0.24
Aug	0.01	0.31	0.00	0.32
Sep	0.02	0.08	0.01	0.11
Oct	0.01	0.33	0.00	0.34
Nov	0.01	0.42	0.04	0.47
Dec	0.01	0.65	0.04	0.70
Annual	0.18	5.88	0.24	6.30

\* Floating barge-type terminal. Direction determined by weathervaning of barge in prevailing winds.

Table B39

Bechers Bay Potential Offshore LNG Terminal Site6-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.38	0.06	0.44
Feb	0.16	0.40	0.09	0.65
Mar	0.52	0.58	0.04	1.14
Apr	0.42	0.32	0.06	0.80
May	0.43	0.03	0.01	0.47
Jun	0.75	0.00	0.01	0.76
Jul	0.14	0.00	0.04	0.18
Aug	0.07	0.00	0.02	0.09
Sep	0.04	0.00	0.01	0.05
Oct	0.10	0.22	0.04	0.36
Nov	0.15	0.40	0.15	0.70
Dec	0.04	0.44	0.13	0.61
Annual	2.82	2.77	0.66	6.25

---

\* One fixed berth.

Table B40

Bechers Bay Potential Offshore LNG Terminal Site8-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.08	0.00	0.08
Feb	0.09	0.09	0.01	0.19
Mar	0.18	0.28	0.02	0.48
Apr	0.13	0.14	0.02	0.29
May	0.13	0.00	0.00	0.13
Jun	0.22	0.00	0.00	0.22
Jul	0.02	0.00	0.02	0.04
Aug	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00
Oct	0.01	0.06	0.02	0.09
Nov	0.04	0.12	0.02	0.18
Dec	0.01	0.12	0.06	0.19
Annual	0.83	0.89	0.17	1.89

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\* Two fixed berths or floating barge-type terminal.



Table B41

Bechers Bay Potential Offshore LNG Terminal Site10.5-Ft Maximum Allowable Height CriteriaPercent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.00	0.00	0.00
Feb	0.03	0.00	0.00	0.03
Mar	0.02	0.11	0.01	0.14
Apr	0.01	0.04	0.01	0.06
May	0.03	0.00	0.00	0.03
Jun	0.04	0.00	0.00	0.04
Jul	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.00	0.00
Oct	0.00	0.00	0.00	0.00
Nov	0.00	0.03	0.01	0.04
Dec	0.00	0.01	0.03	0.04
Annual	0.13	0.19	0.06	0.38

---

\* Single mooring tower.

Table B42

Bechers Bay Potential Offshore LNG Terminal Site  
Delft Hydraulics Laboratory Optimization Criteria  
Percent of Year Exceeded\*

<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.00	0.22	0.00	0.22
Feb	0.03	0.21	0.00	0.24
Mar	0.02	0.23	0.02	0.27
Apr	0.02	0.10	0.01	0.13
May	0.03	0.04	0.00	0.07
Jun	0.04	0.00	0.00	0.04
Jul	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00
Sep	0.00	0.01	0.00	0.01
Oct	0.00	0.13	0.00	0.13
Nov	0.01	0.17	0.04	0.22
Dec	0.00	0.21	0.03	0.24
Annual	0.15	1.32	0.10	1.57

---

\* One fixed berth ( $\theta = 0^\circ$ ). A second fixed berth does not appear feasible at this location

Table B43

Bechers Bay Potential Offshore LNG Terminal Site75 Percent of Delft Optimization CriteriaPercent of Year Exceeded\*

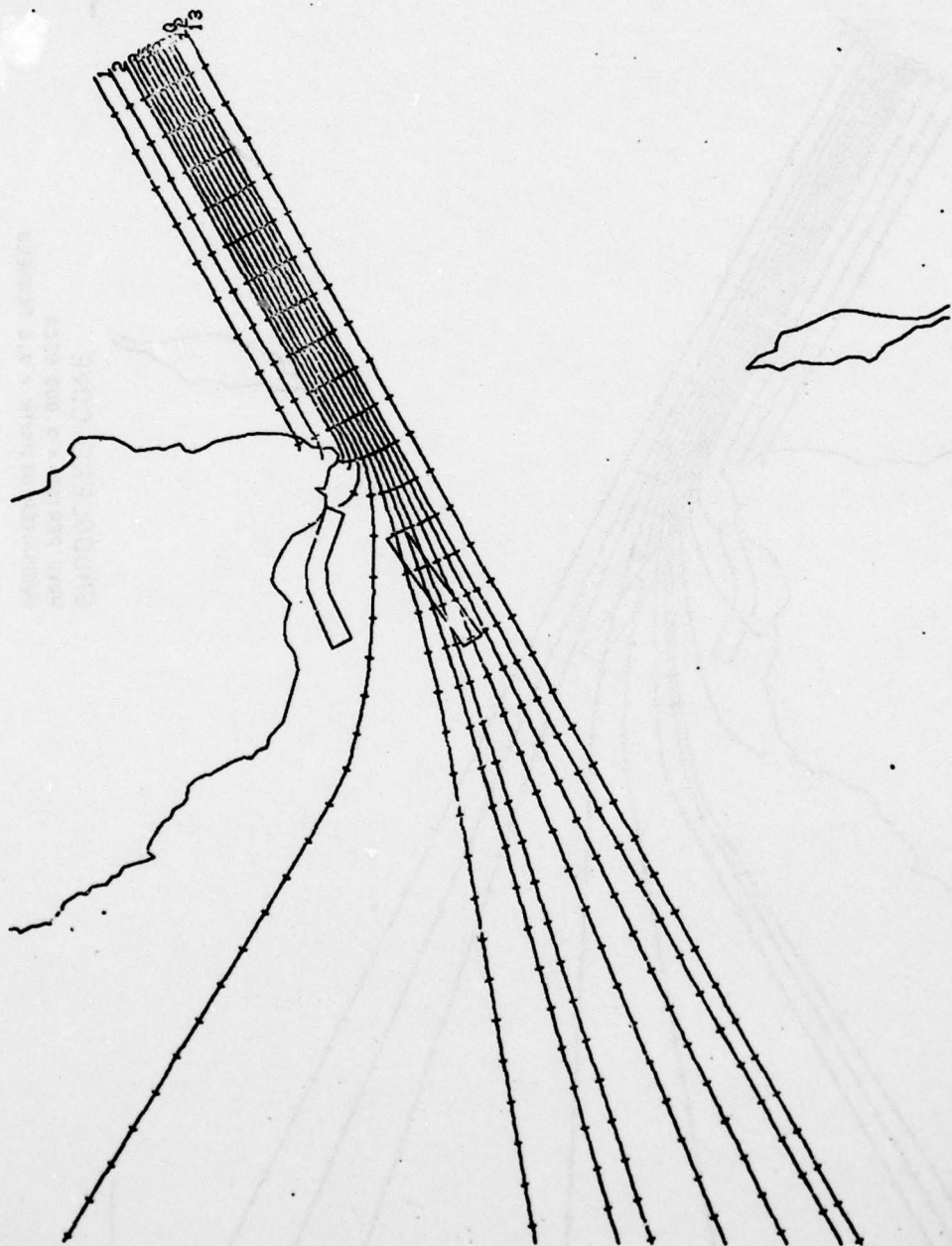
<u>Month</u>	<u>Decayed Sea</u>	<u>Northern Swell</u>	<u>Local Sea</u>	<u>Total</u>
Jan	0.06	0.66	0.02	0.74
Feb	0.16	0.62	0.02	0.80
Mar	0.46	0.70	0.01	1.17
Apr	0.38	0.29	0.01	0.68
May	0.42	0.11	0.00	0.53
Jun	0.76	0.00	0.00	0.76
Jul	0.25	0.00	0.00	0.25
Aug	0.25	0.00	0.00	0.25
Sep	0.07	0.02	0.00	0.09
Oct	0.18	0.39	0.00	0.57
Nov	0.16	0.52	0.05	0.73
Dec	0.05	0.64	0.03	0.72
Annual	3.20	3.95	0.14	7.29

\* Floating barge-type terminal. Direction determined by weathervaning of barge in prevailing winds.

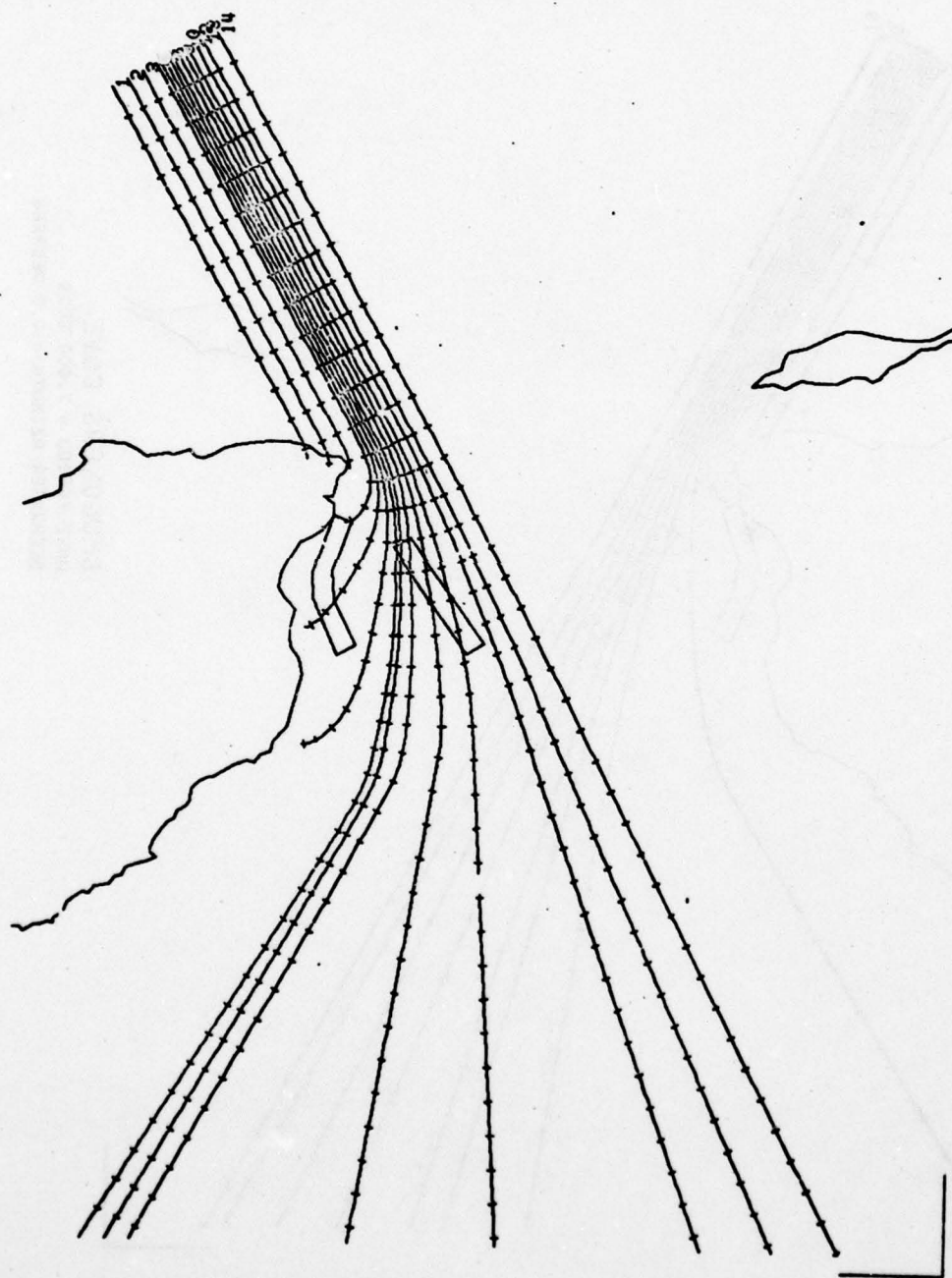


#### ADDENDUM I: WAVE RAY PLOTS

In the following figures, the tentative potential LNG terminal site is positioned at the geometric center of the rectangle; it also coincides with the specified mllw contour at that location.

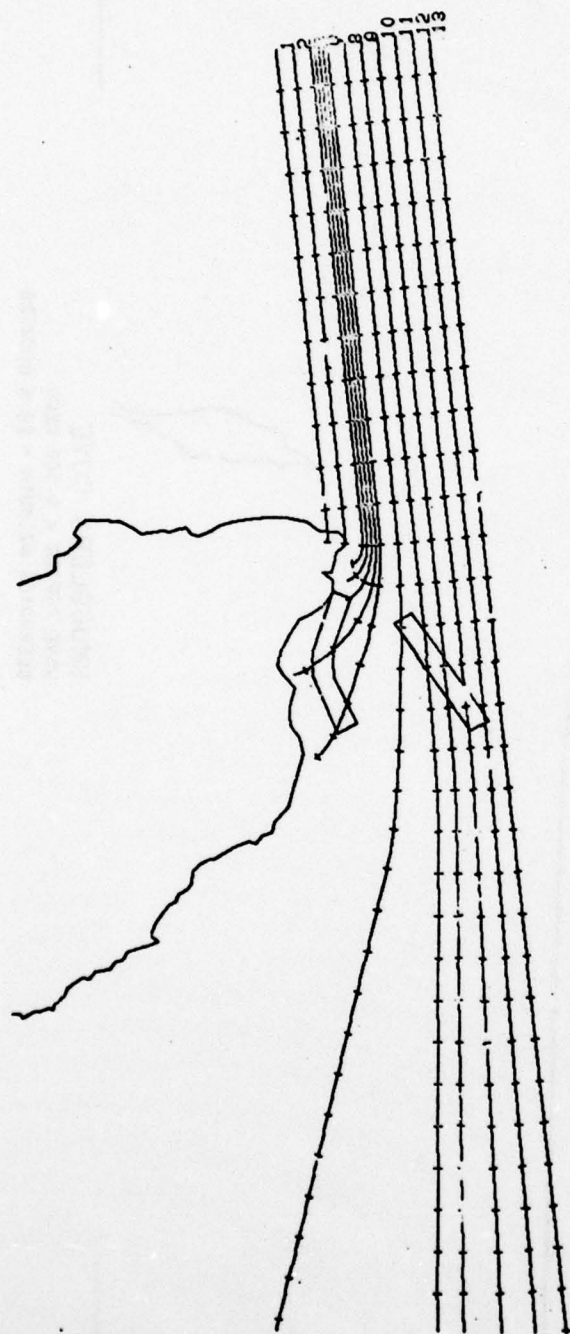


SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES

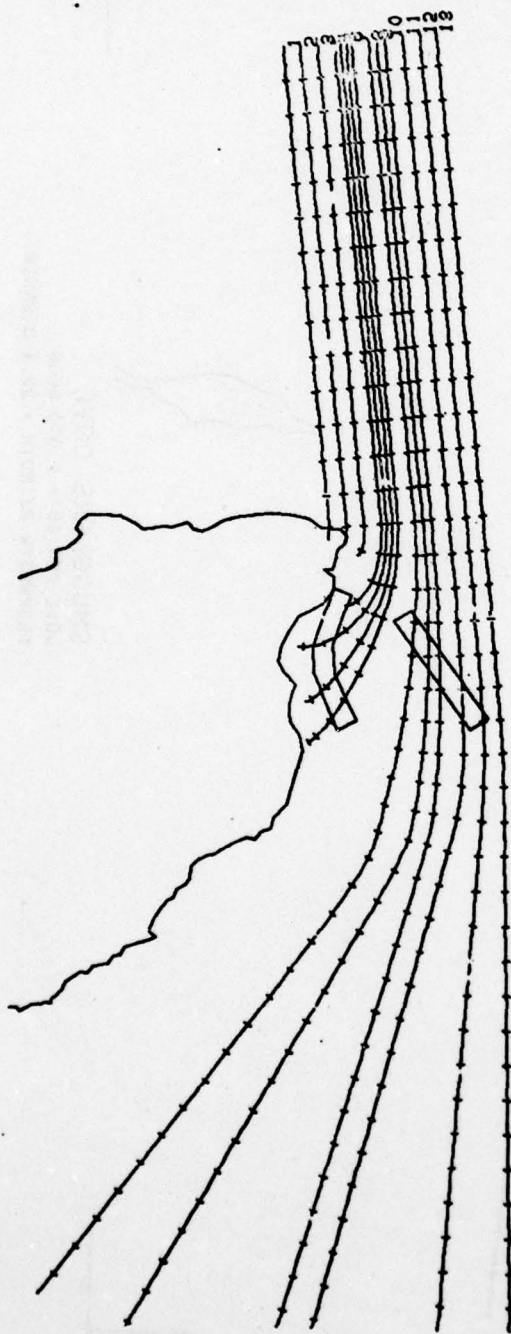


SMUGGLERS COVE  
WAVE PERIOD = 8.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES

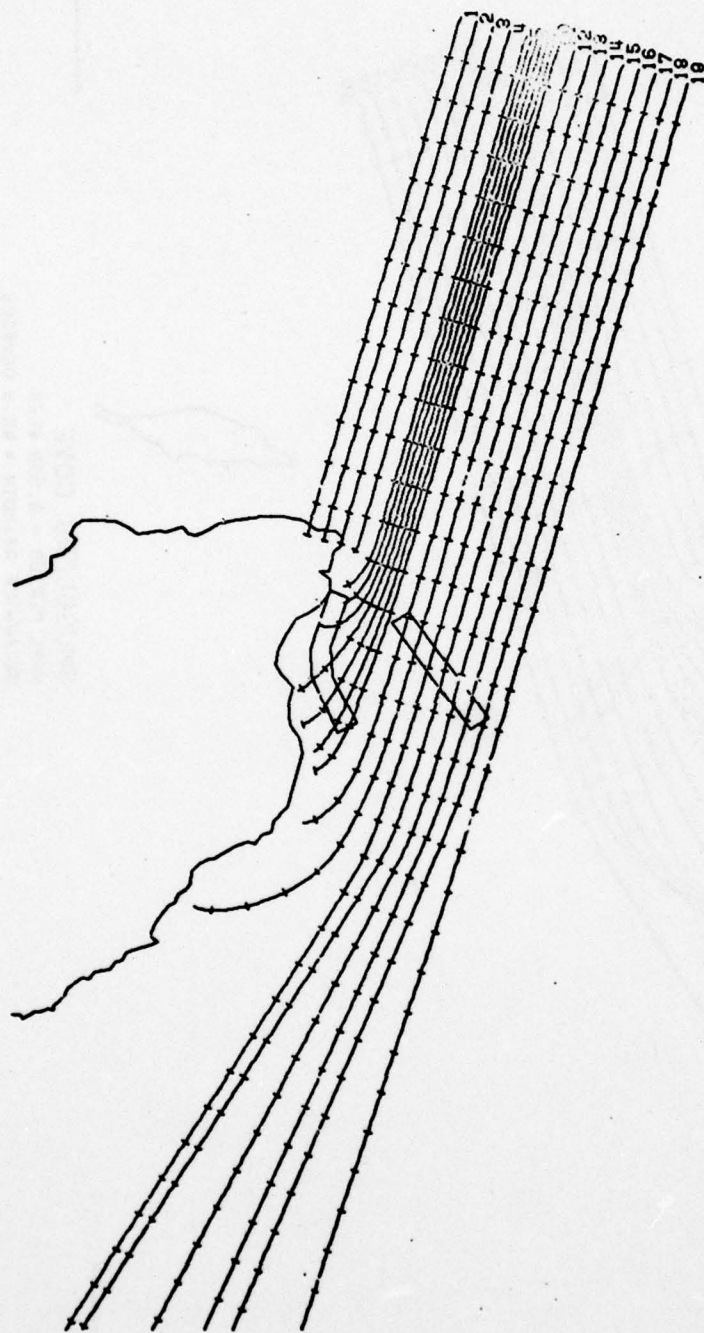




SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES

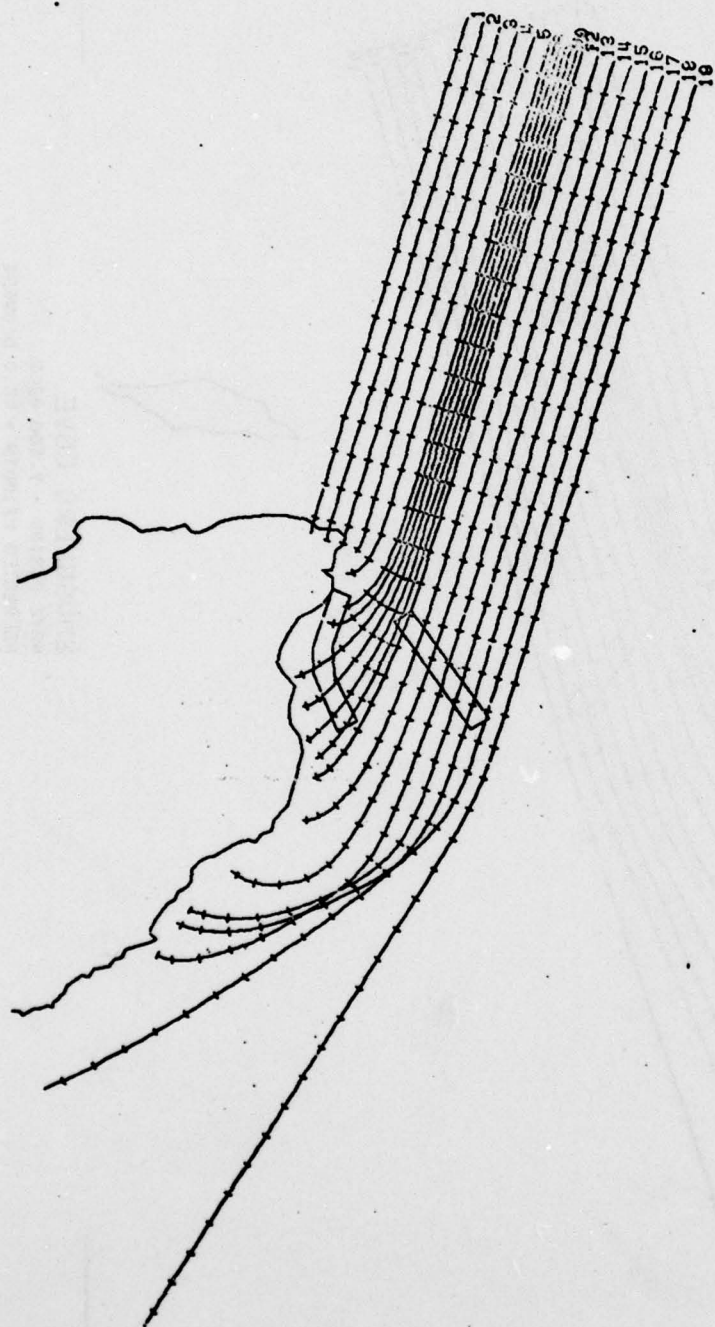


SMUGGLERS COVE  
WAVE PERIOD = 0.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES

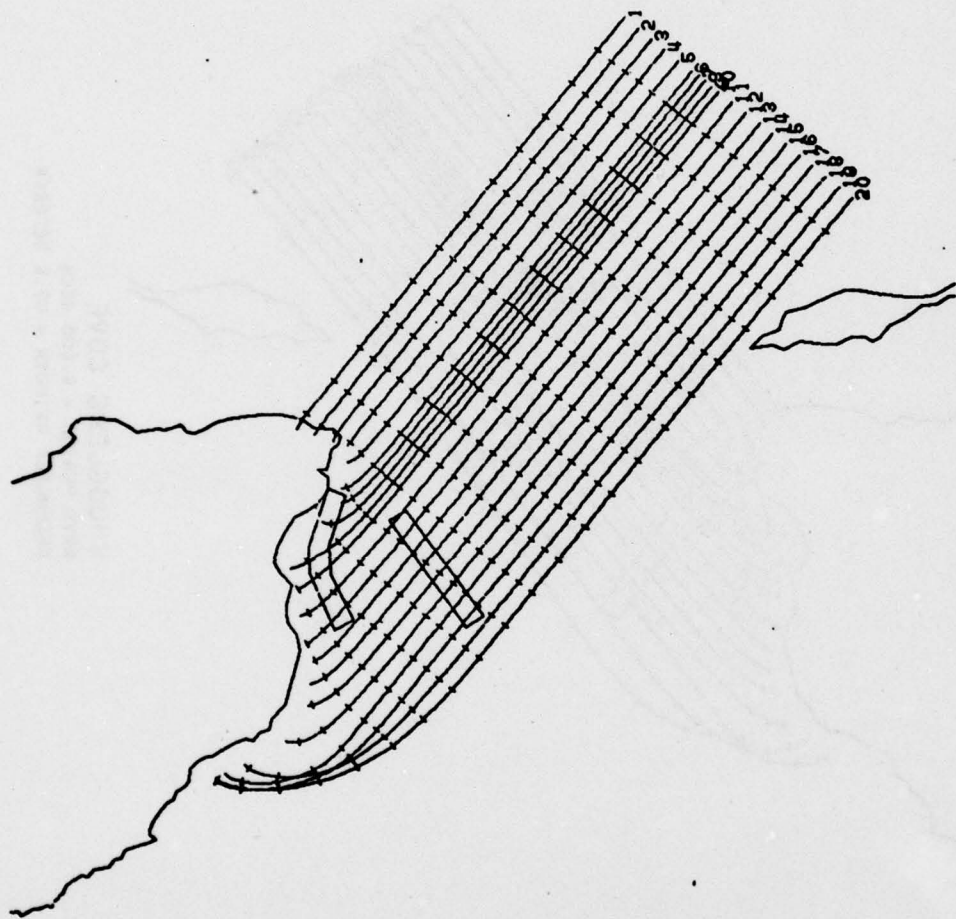


SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

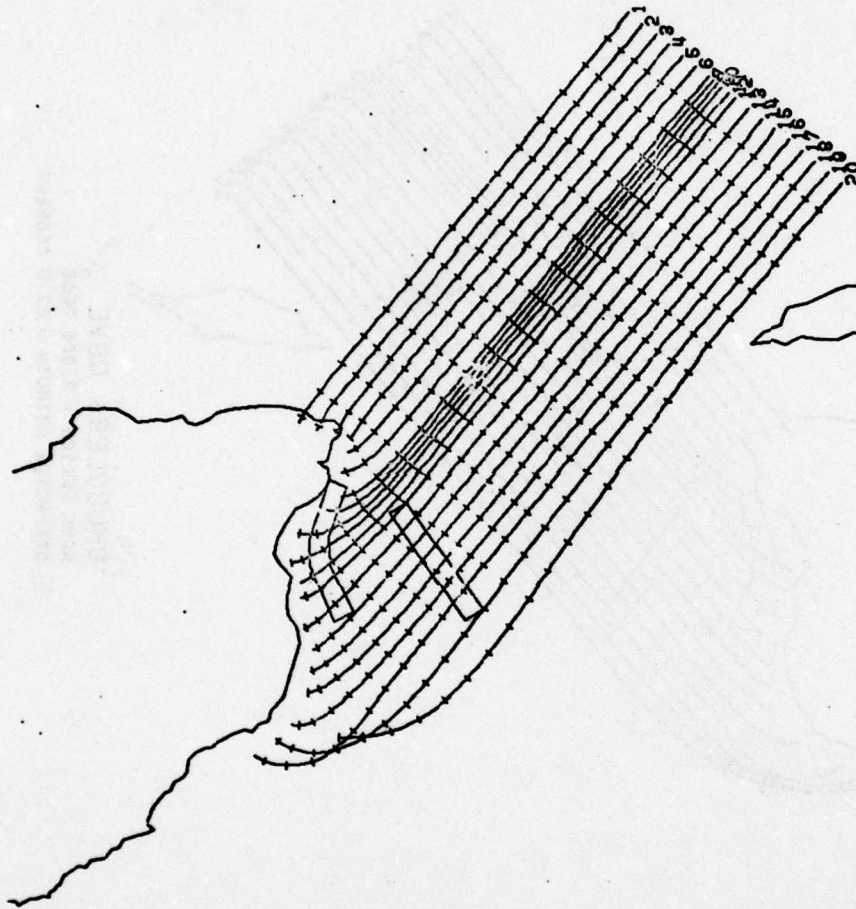




SMUGGLERS COVE  
WAVE PERIOD = 9.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

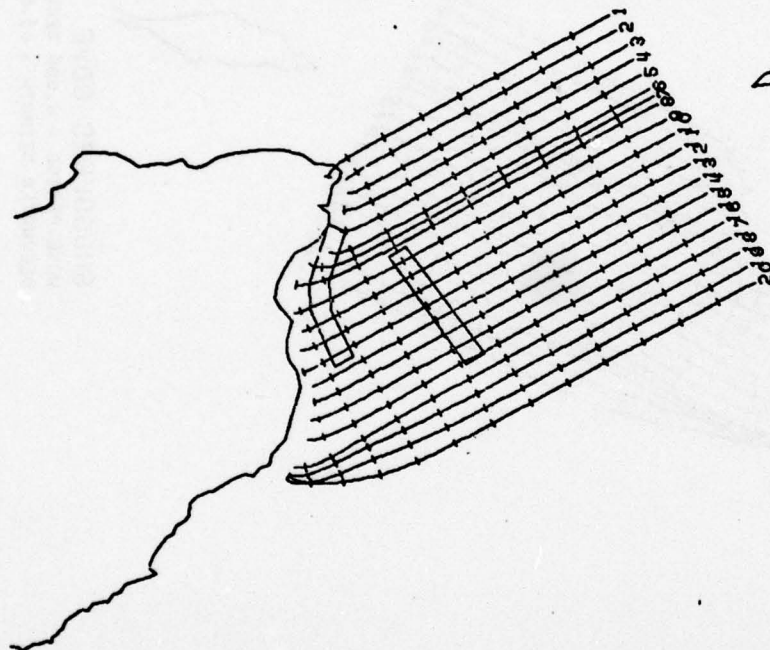


SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 67.5 DEGREES

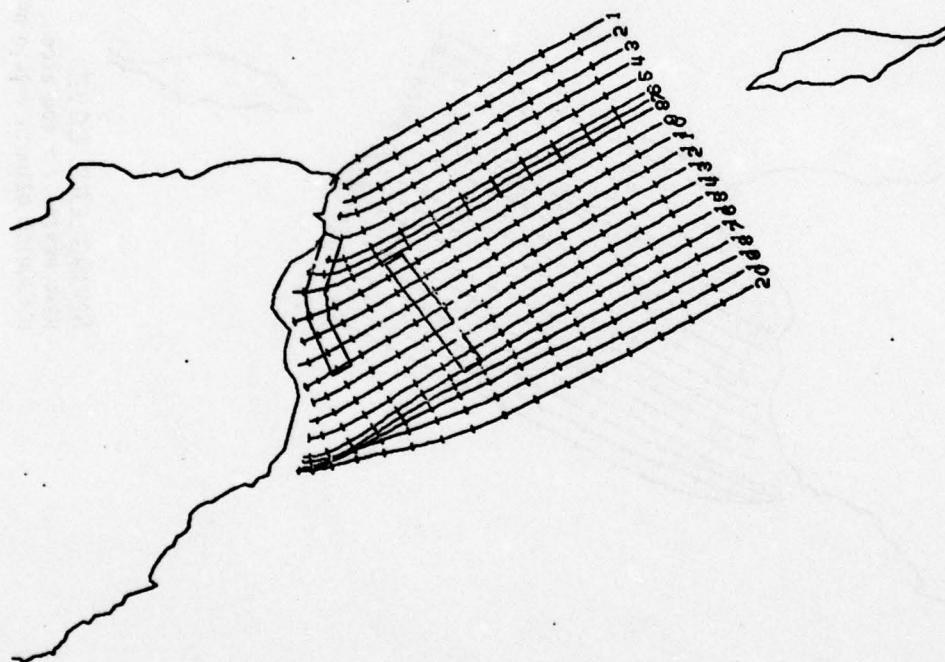


SMUGGLERS COVE  
WAVE PERIOD = 9.000 SECS  
DEEPWATER AZIMUTH = 67.5 DEGREES

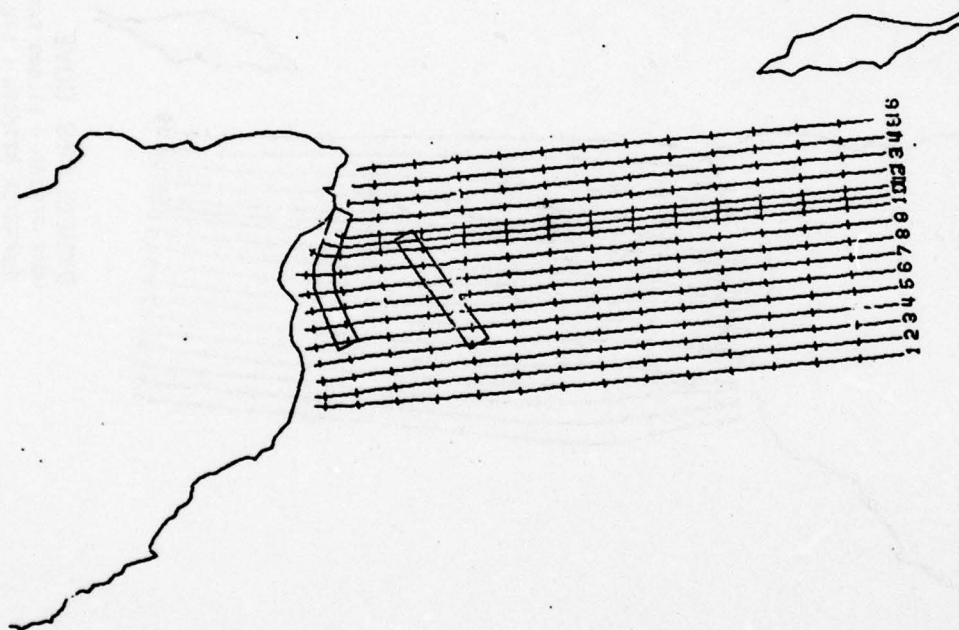




SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 00.0 DEGREES

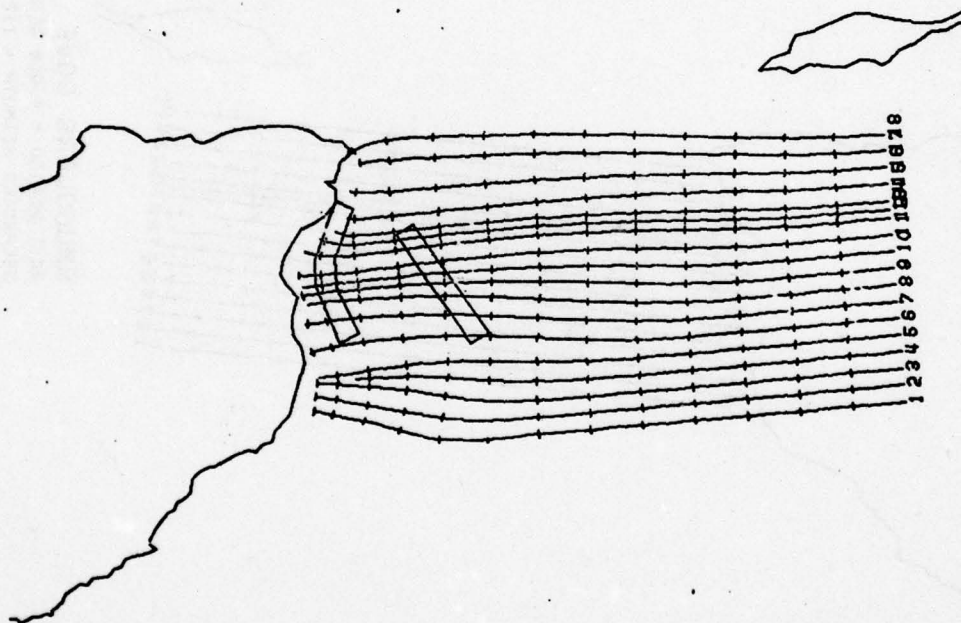


SMUGGLERS COVE  
WAVE PERIOD = 9.000 SECS  
DEEPWATER AZIMUTH = 90.0 DEGREES

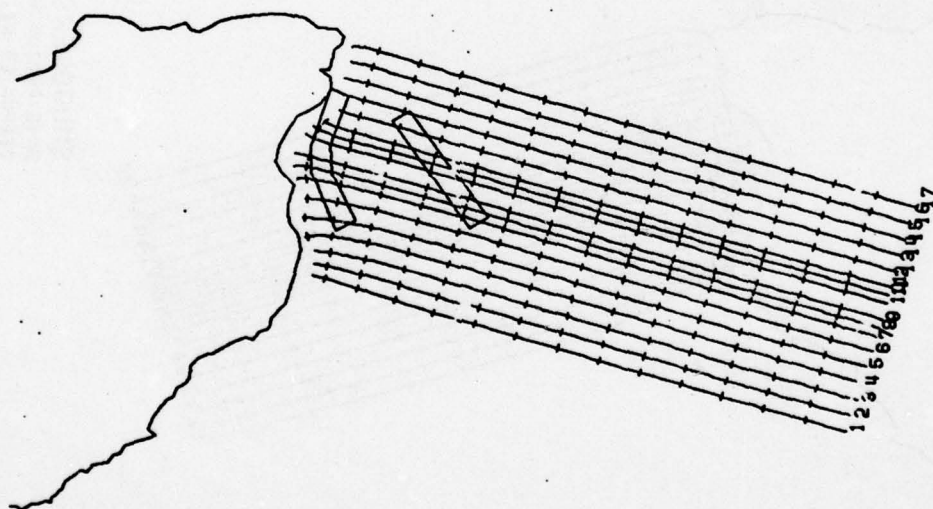


SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 112.5 DEGREES





SMUGGLERS COVE  
 WAVE PERIOD = 11.000 SECS  
 DEEPWATER AZIMUTH = 112.5 DEGREES



SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 135.0 DEGREES

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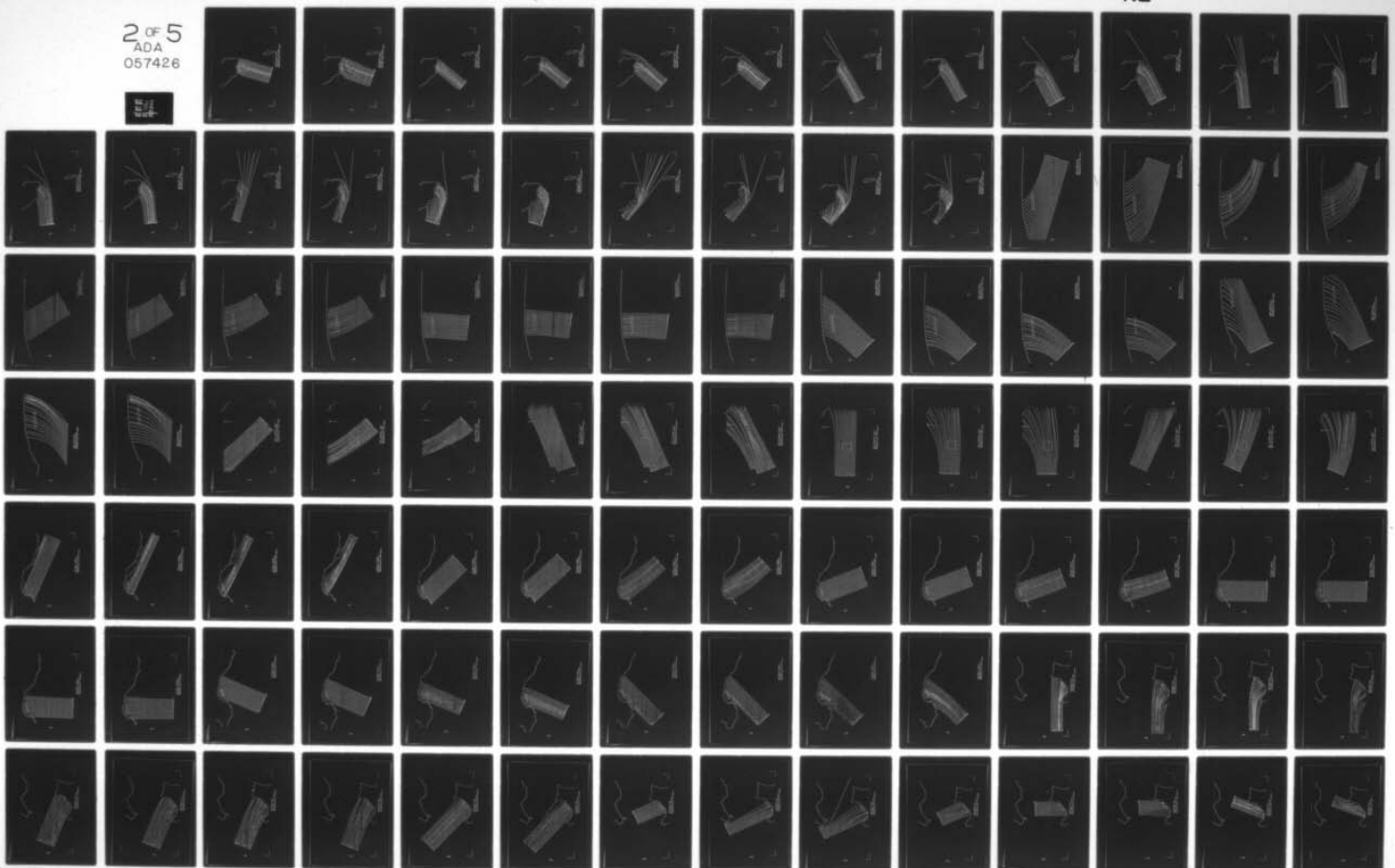
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 13/10  
PRELIMINARY EVALUATION OF WIND AND WAVE EFFECTS AT POTENTIAL LN--ETC(U).  
JUL 78 L Z HALES

UNCLASSIFIED

WES-MP-H-78-2-APP-B

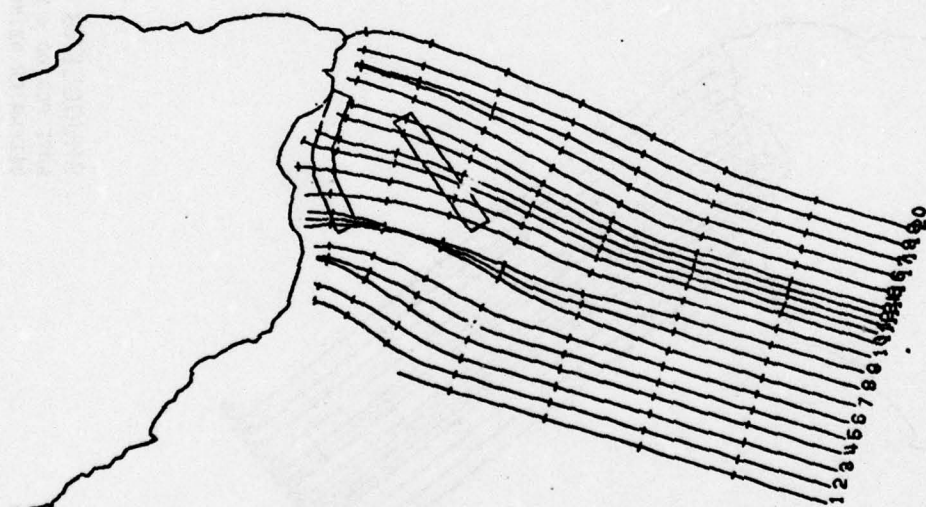
NL

2 OF 5  
ADA  
057426

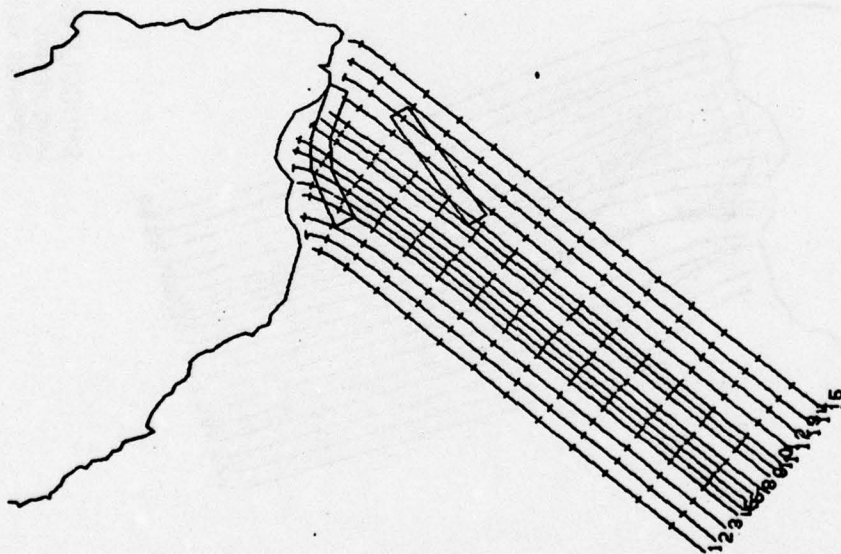






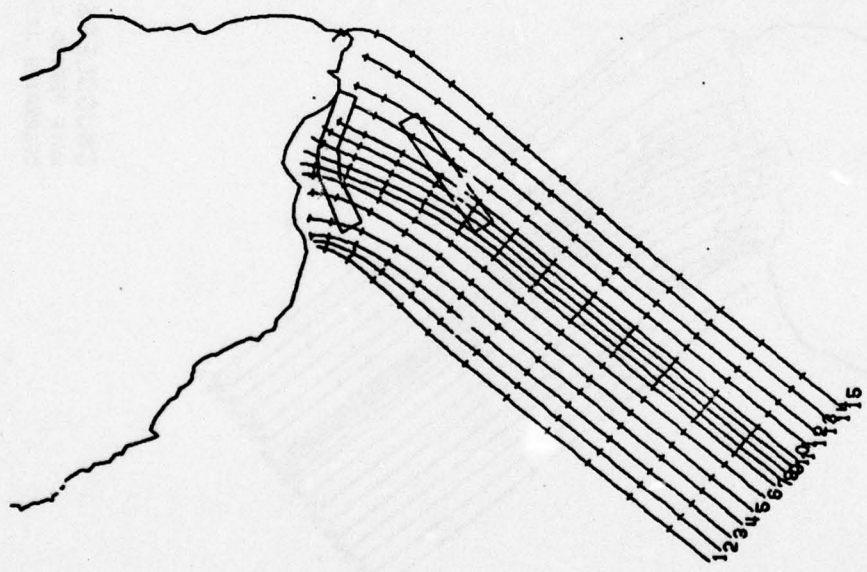


SMUGGLERS COVE  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 135.0 DEGREES

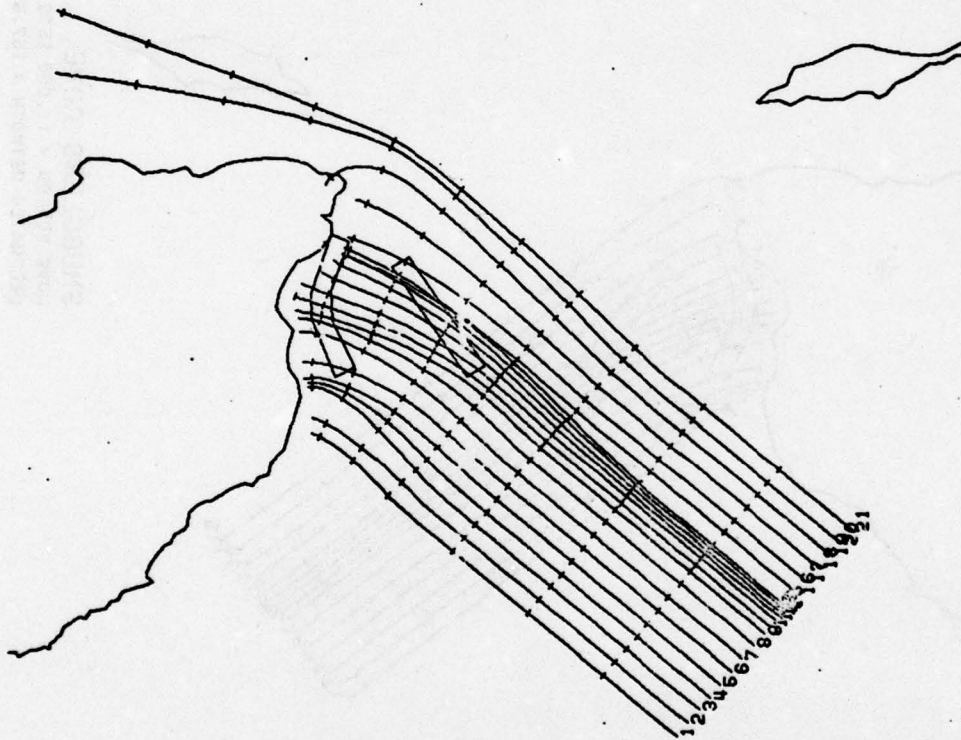


SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 157.5 DEGREES

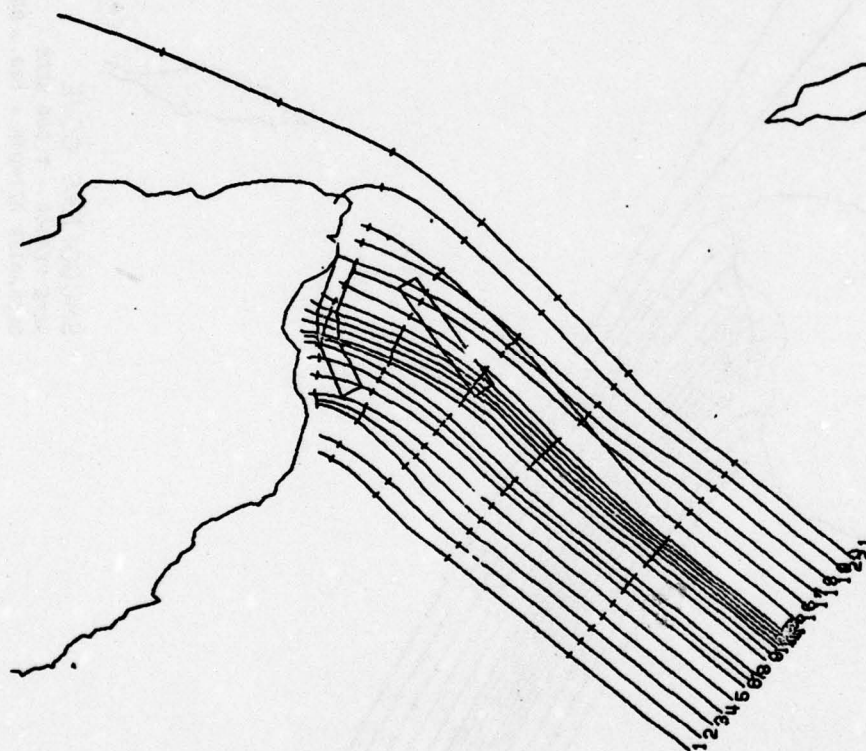




SMUGGLERS COVE  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 157.5 DEGREES

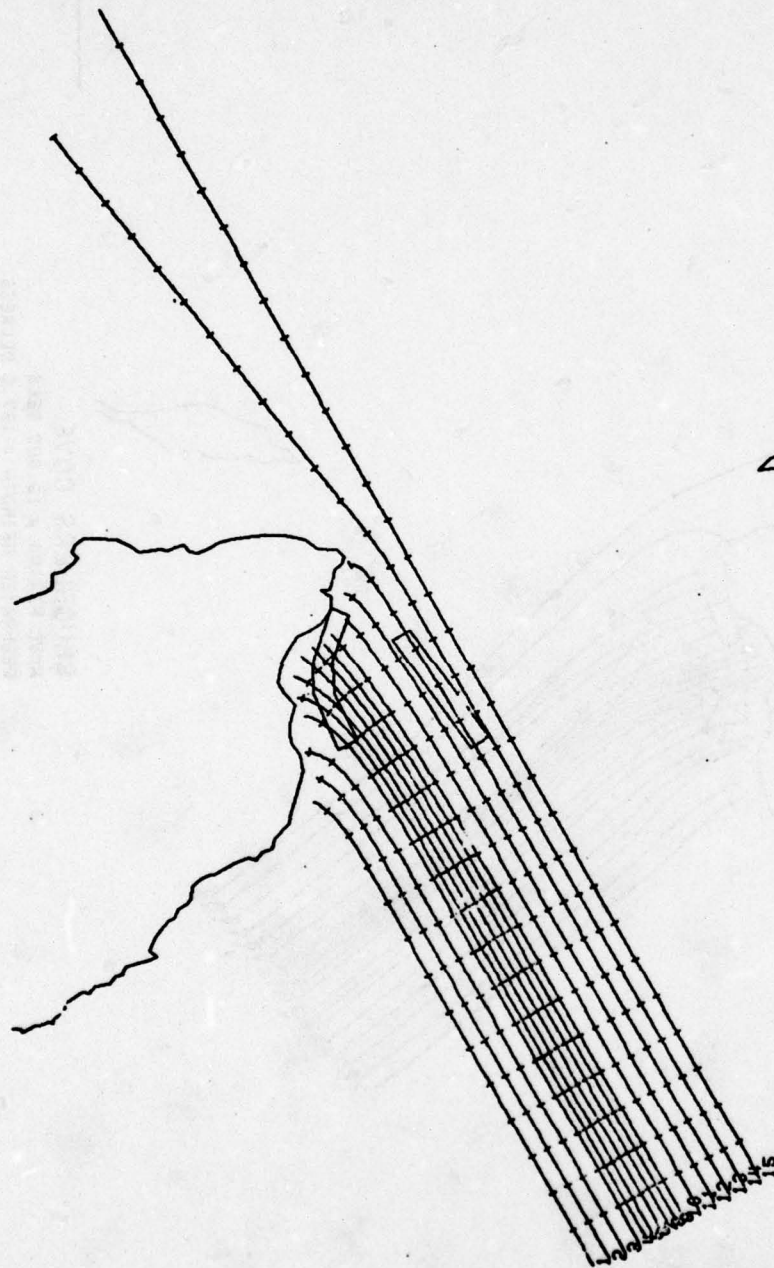


SMUGGLERS COVE  
WAVE PERIOD = 15.000 SECS  
DEEPMETER AZIMUTH = 157.5 DEGREES

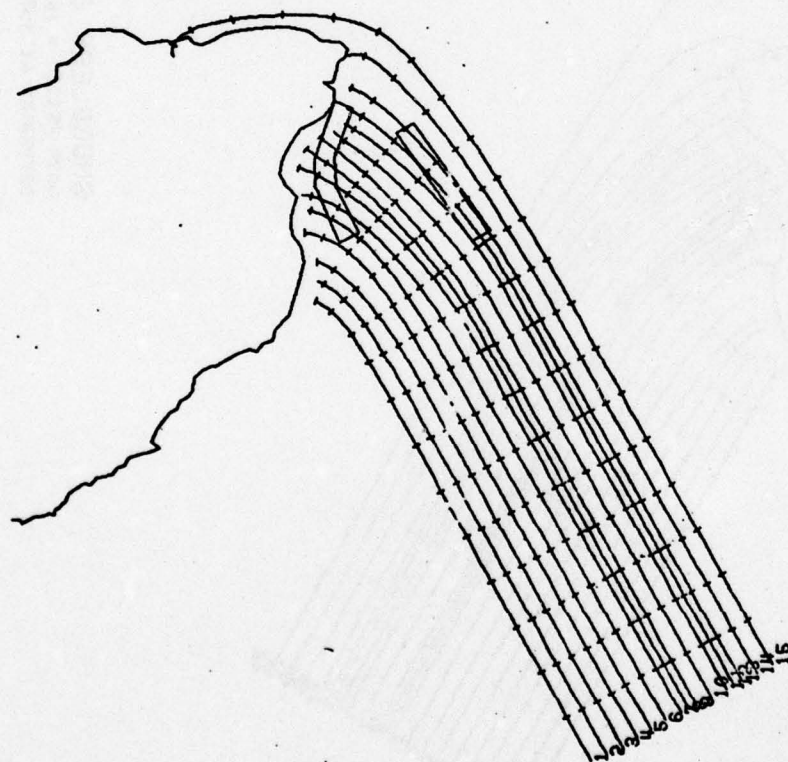


SMUGGLERS COVE  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 157.5 DEGREES

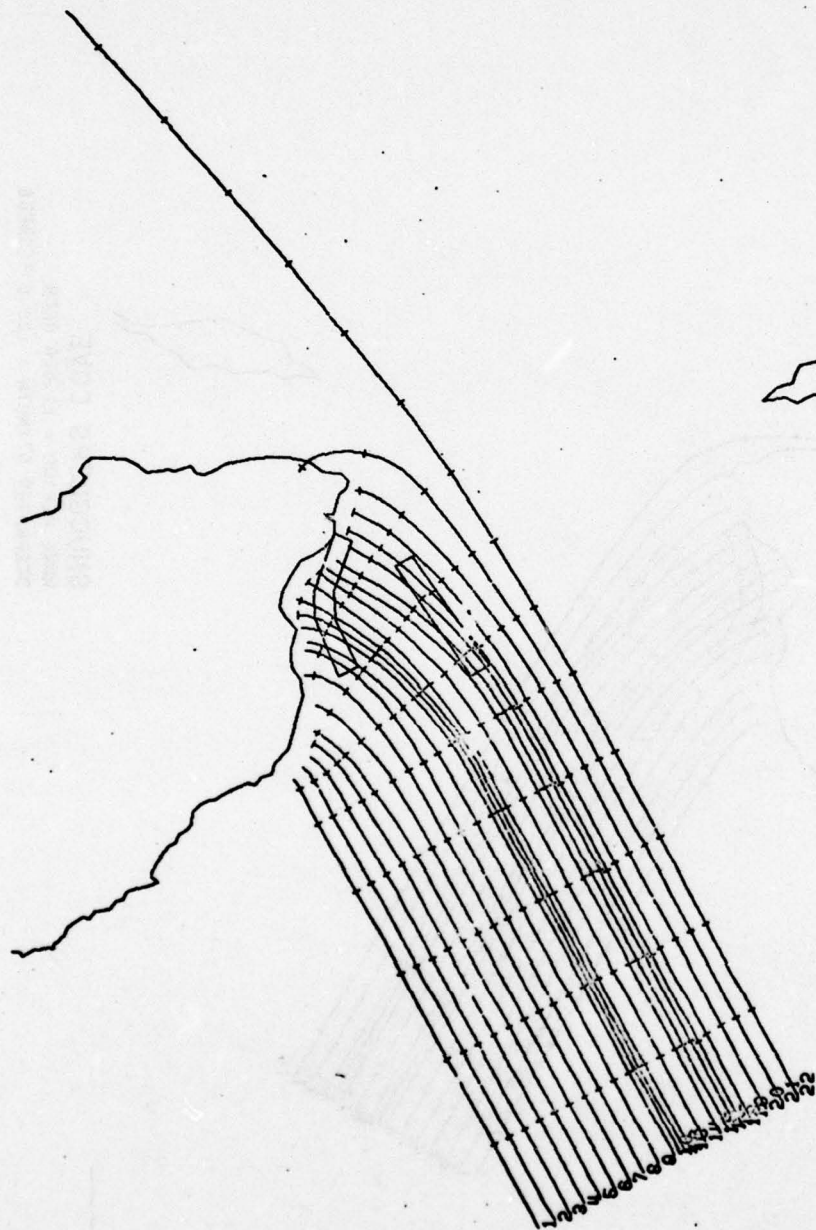




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WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 190.0 DEGREES

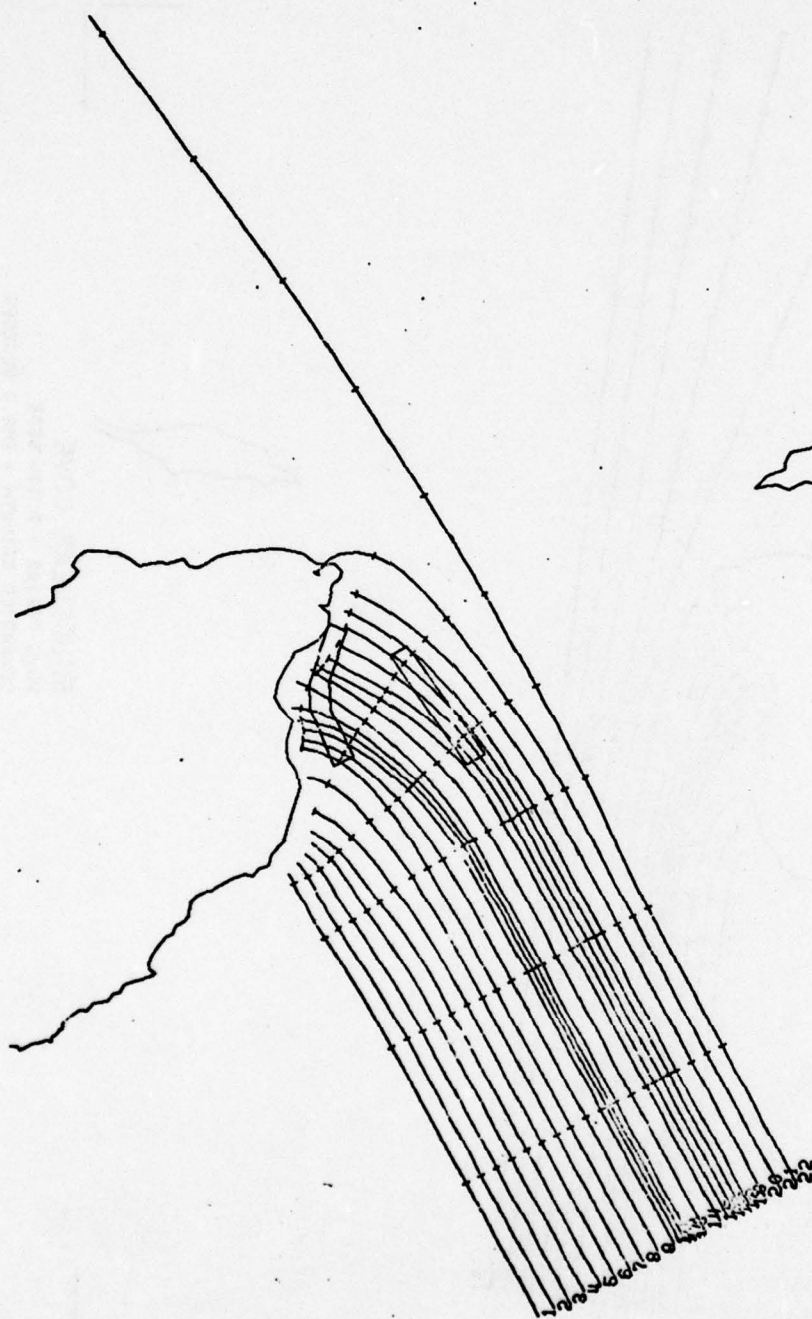


SMUGGLERS COVE  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZINUTH = 180.0 DEGREES

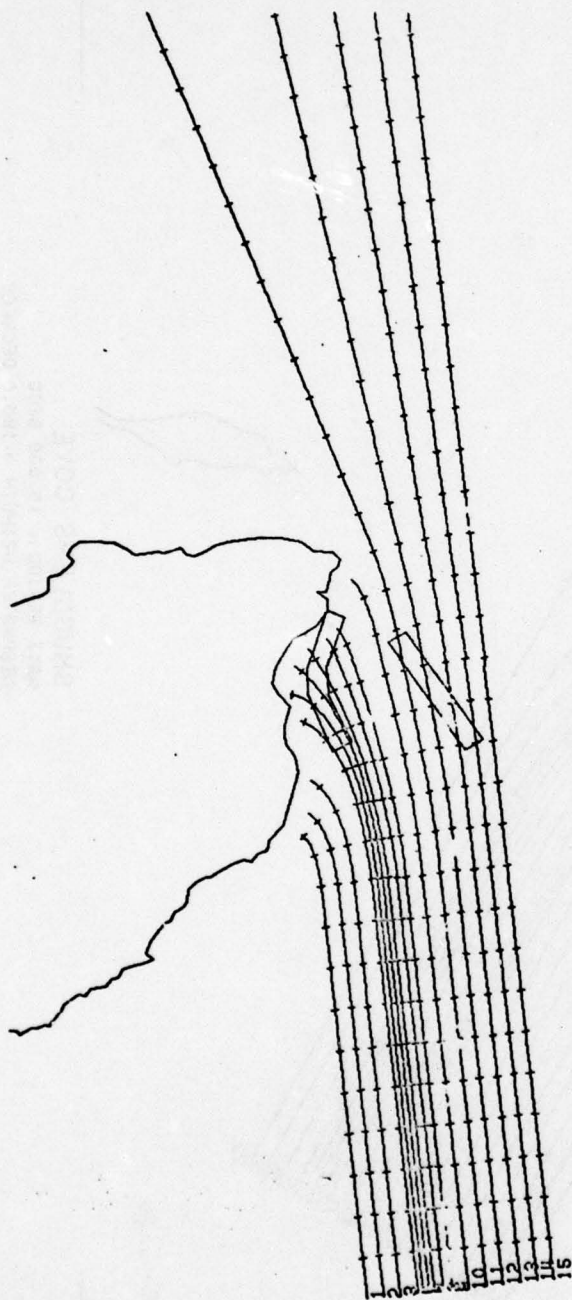


SMUGGLERS COVE  
WAVE PERIOD = 15,000 SECS  
DEEPWATER AZIMUTH = 180.0 DEGREES

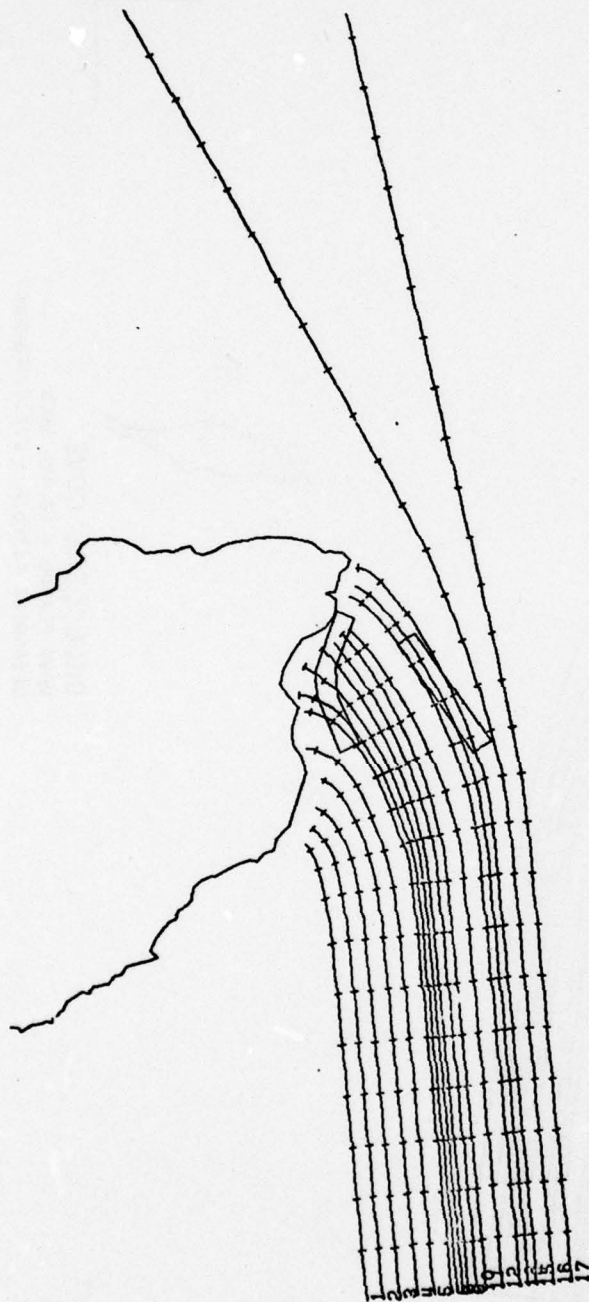




SMUGGLERS COVE  
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DEEPWATER AZIMUTH = 180.0 DEGREES

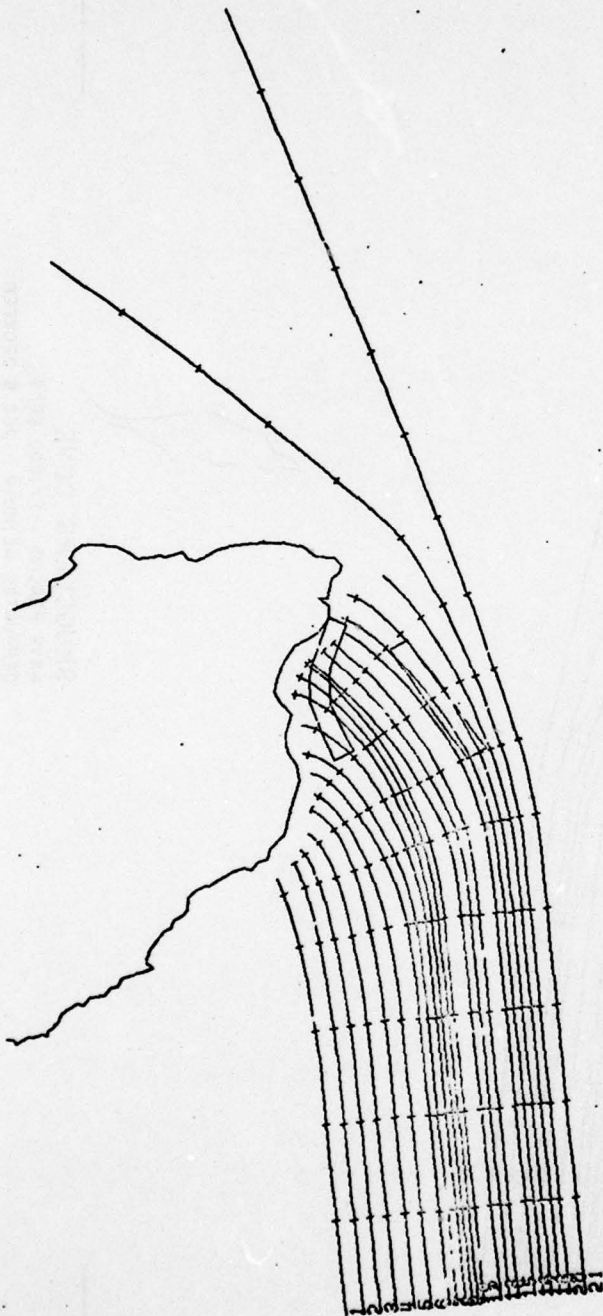


SMUGGLERS COVE  
 WAVE PERIOD = 7.000 SECS  
 DEEPWATER AZIMUTH = 202.5 DEGREES



SMUGGLERS COVE  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 202.5 DEGREES

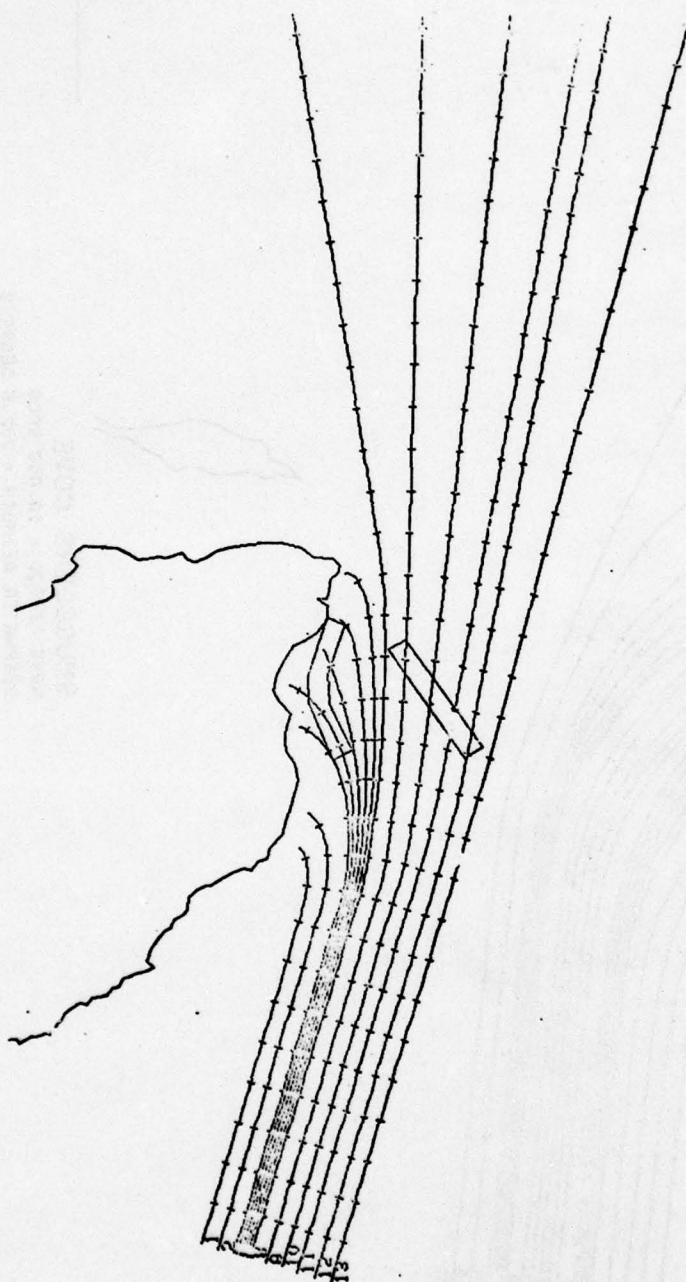




SMUGGLERS COVE  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 202.5 DEGREES



SMUGGLERS COVE  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 202.5 DEGREES



SMUGGLERS COVE  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 225.0 DEGREES

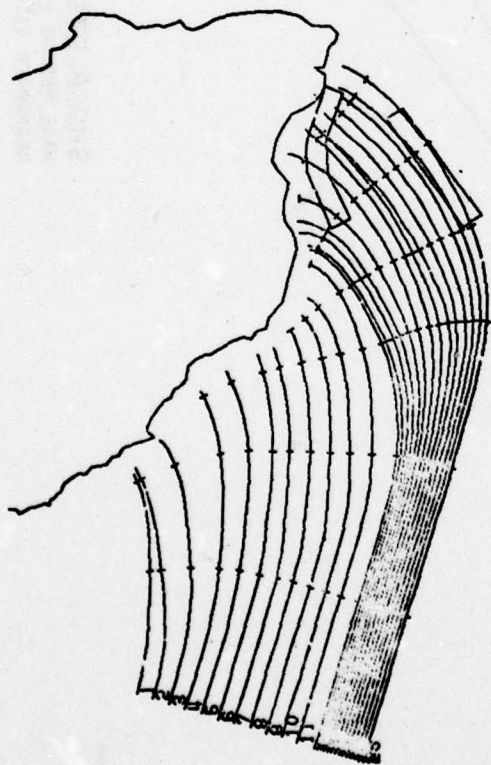




SMUGGLERS COVE  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 226.0 DEGREES

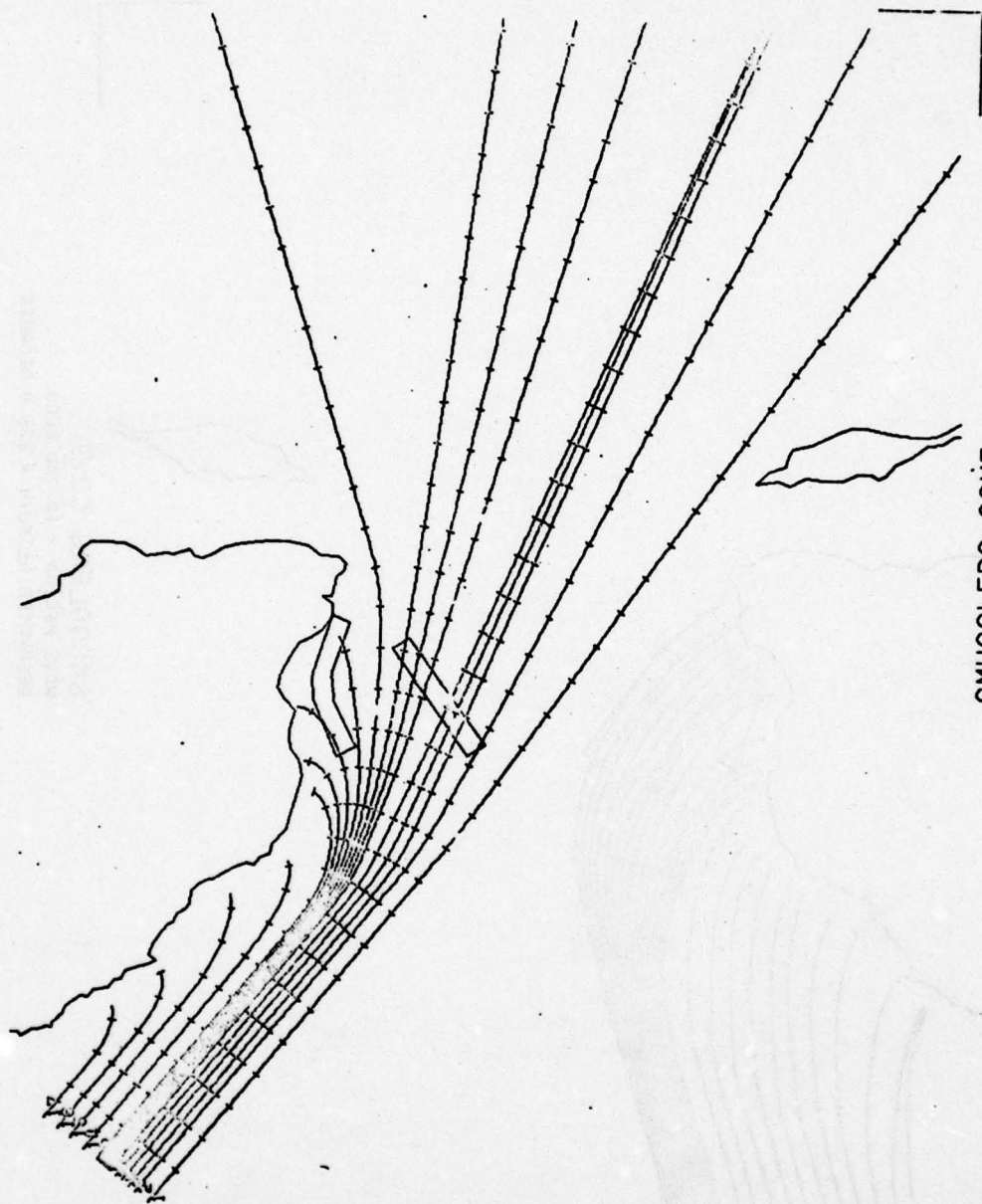


SMUGGLERS COVE  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 225.0 DEGREES



SMUGGLERS COVE  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 225.0 DEGREES

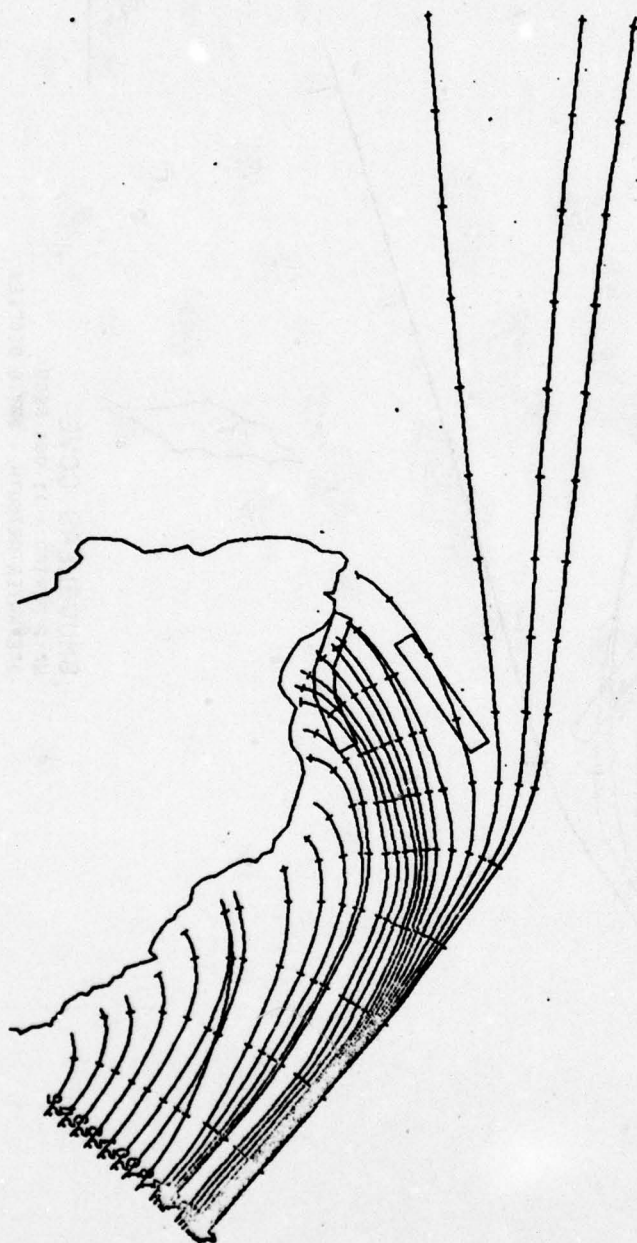




SMUGGLERS COVE  
HAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 247.5 DEGREES



SMUGGLERS COVE  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 247.6 DEGREES

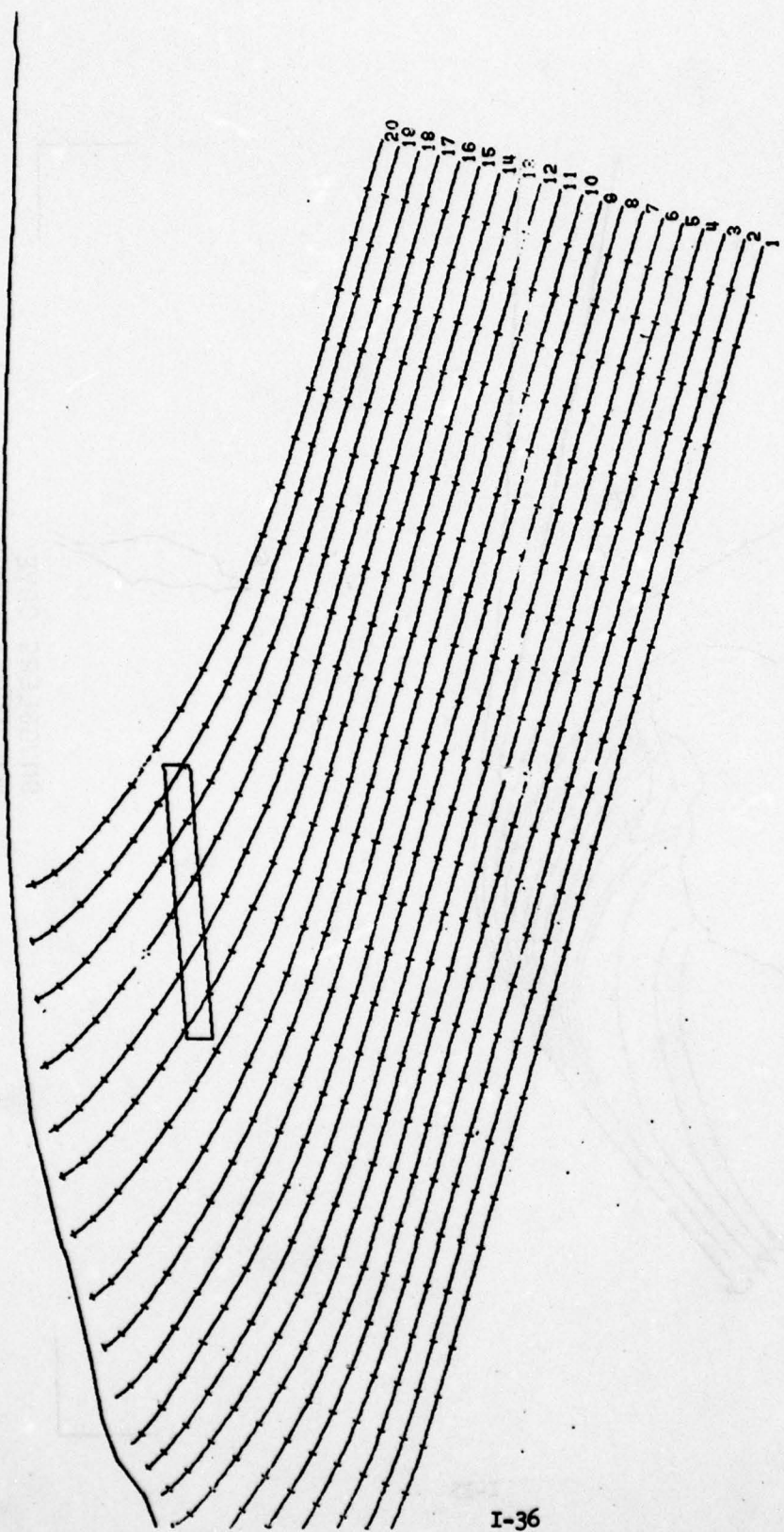


SMUGGLERS COVE  
 WAVE PERIOD = 15.000 SECS  
 DEEPWATER AZIMUTH = 247.5 DEGREES

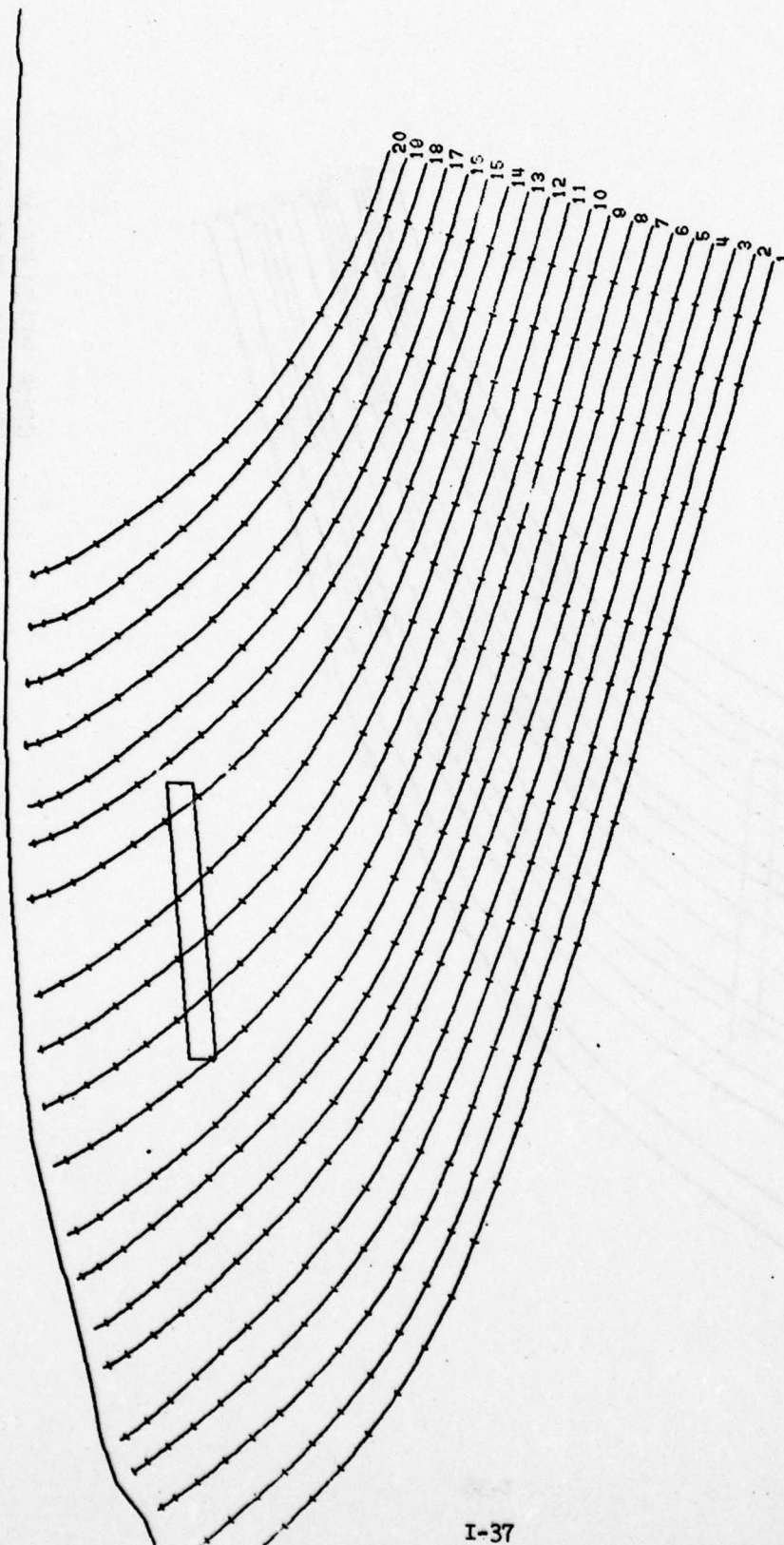




SMUGGLERS COVE  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 247.5 DEGREES

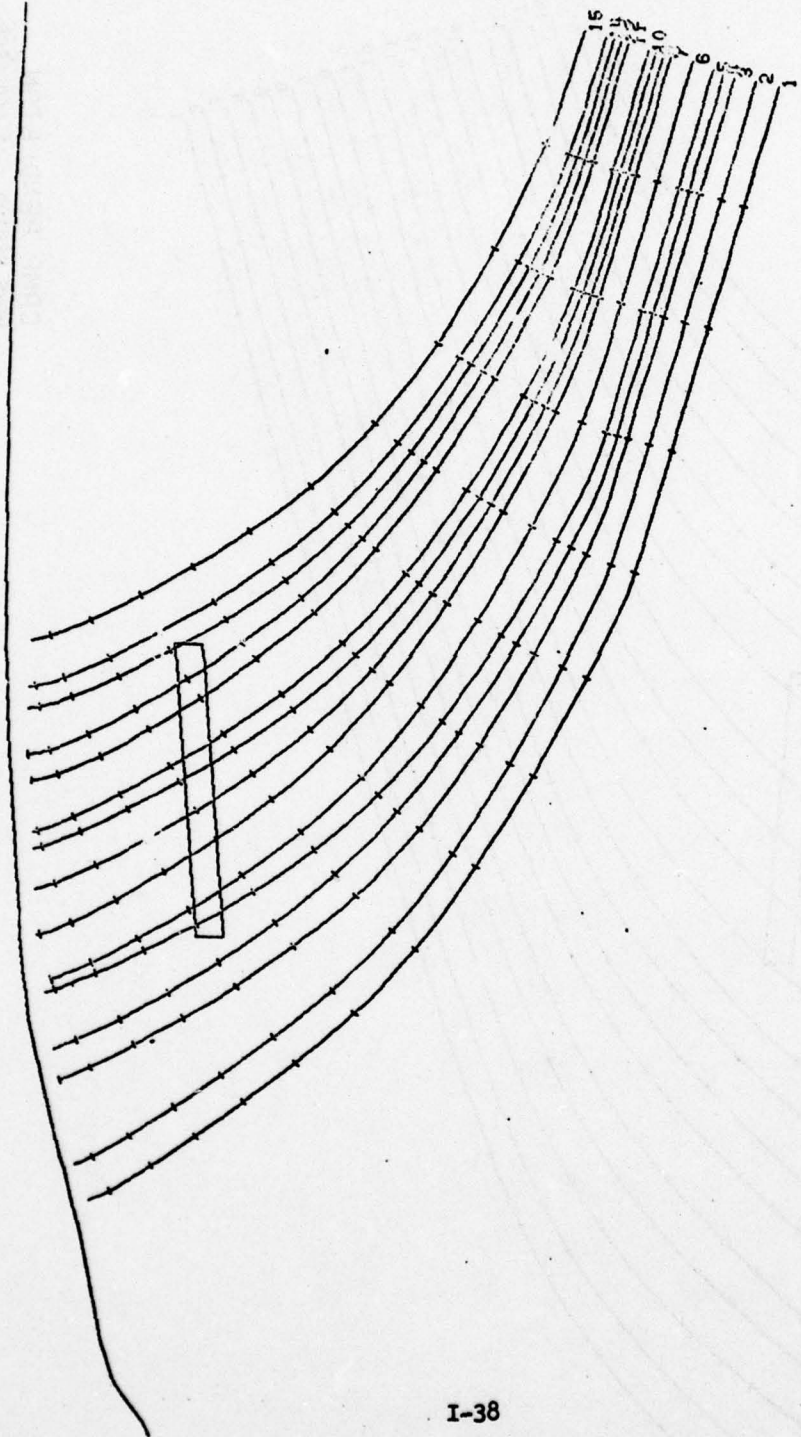


CAMP PENDLETON  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 160.0 DEGREES

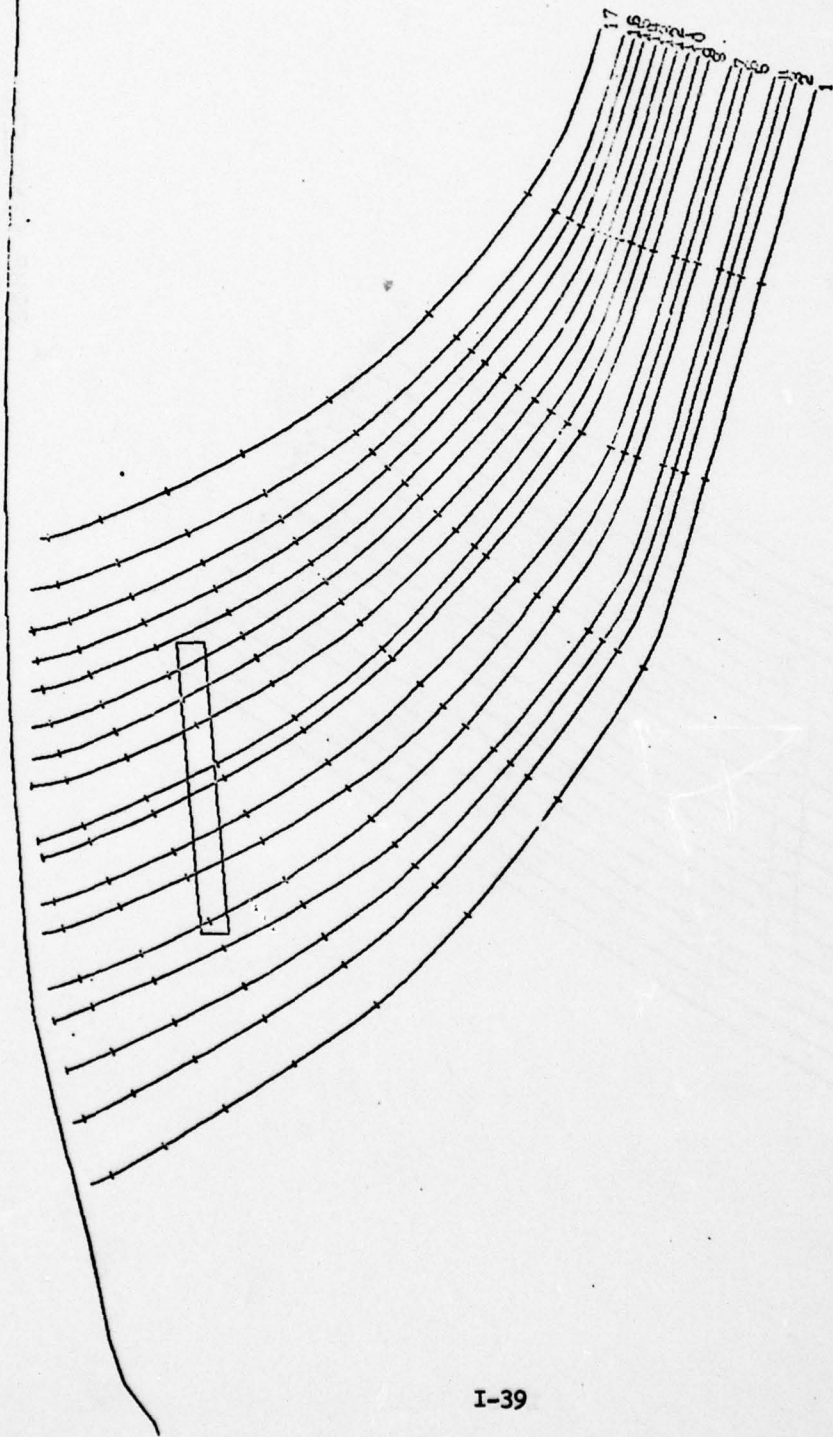


CAMP PENDLETON  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 160.0 DEGREES

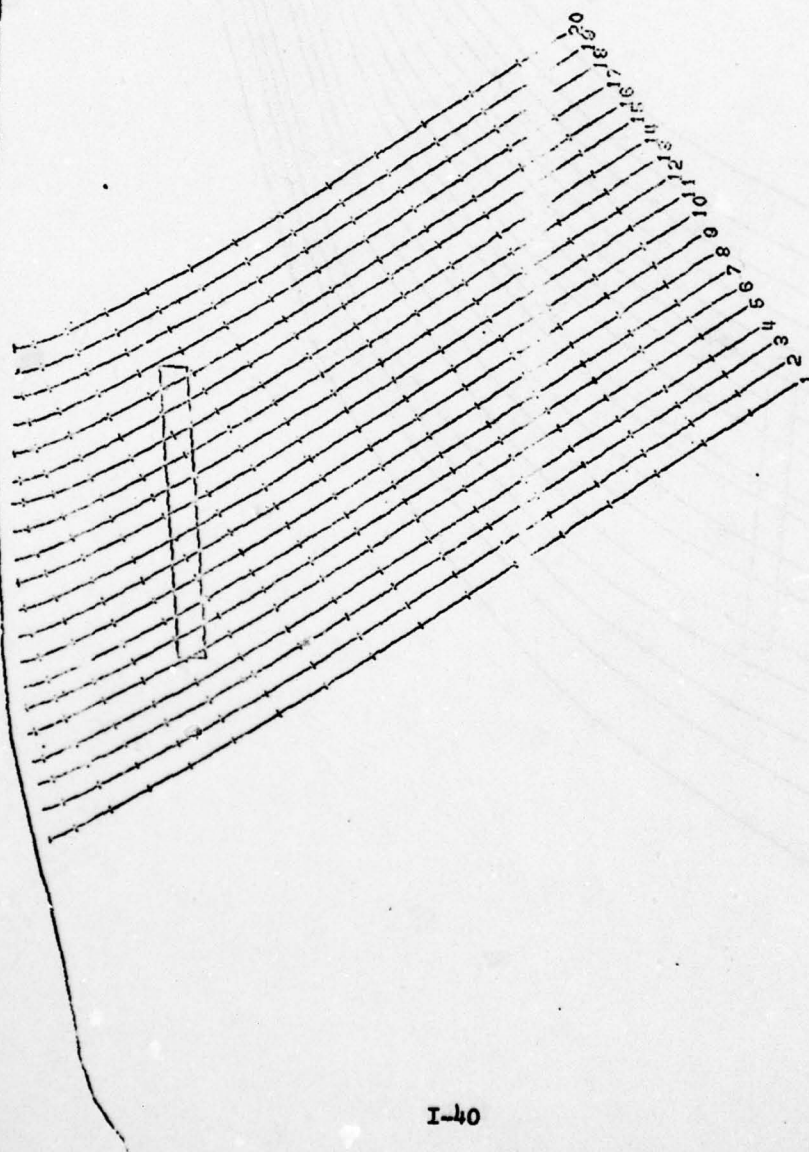




CAMP PENDLETON  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 150.0 DEGREES

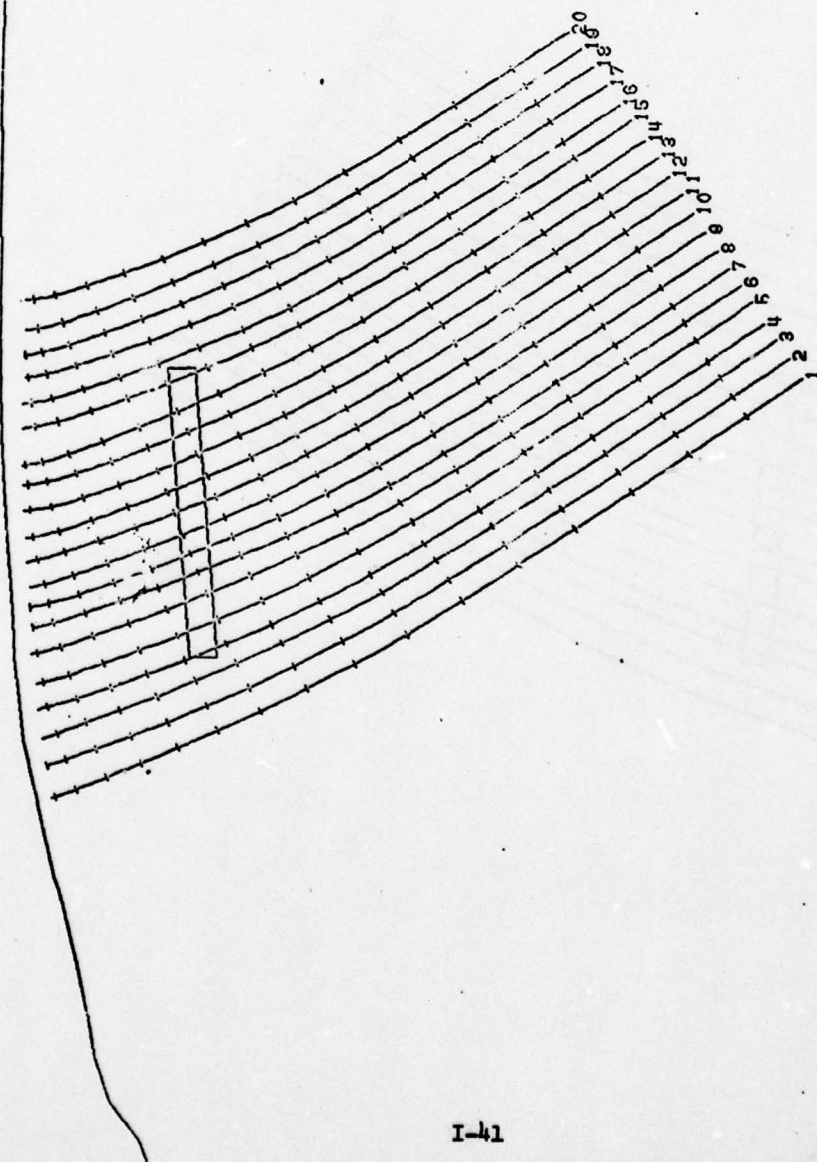


CAMP PENDLETON  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 160.0 DEGREES

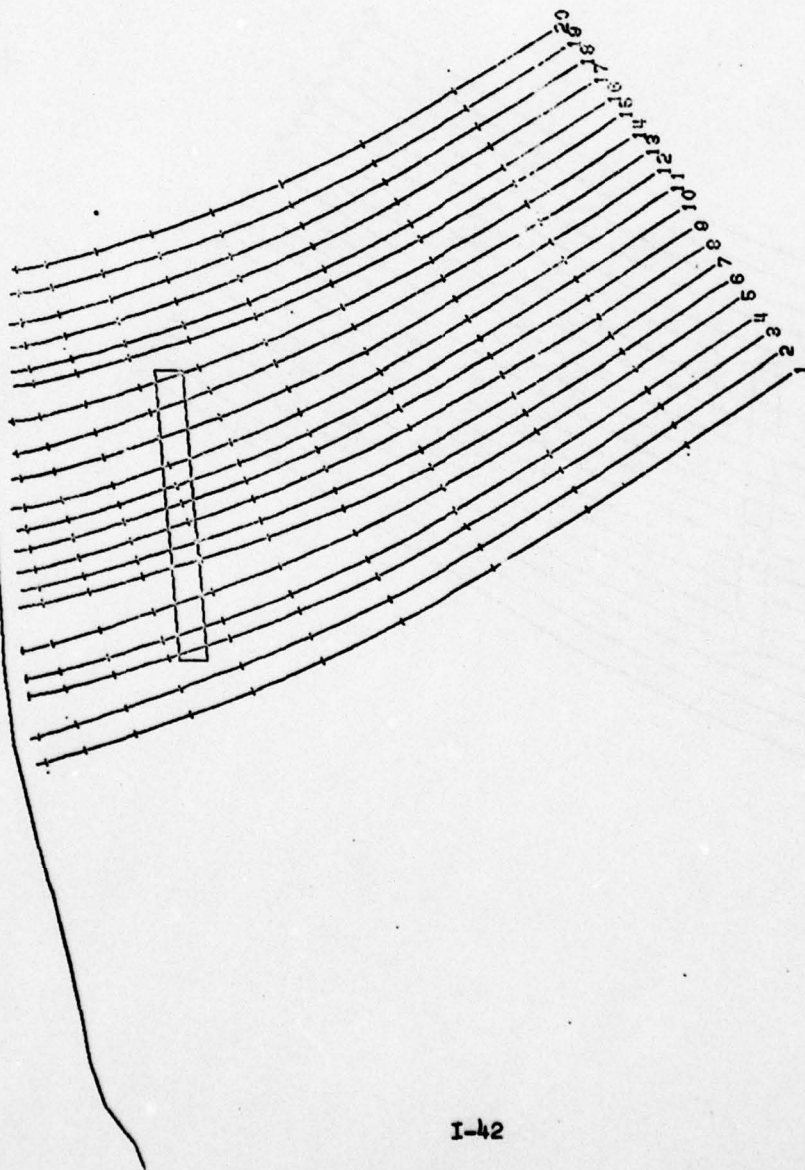


⊥ CAMP PENDLETON  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 200.0 DEGREES

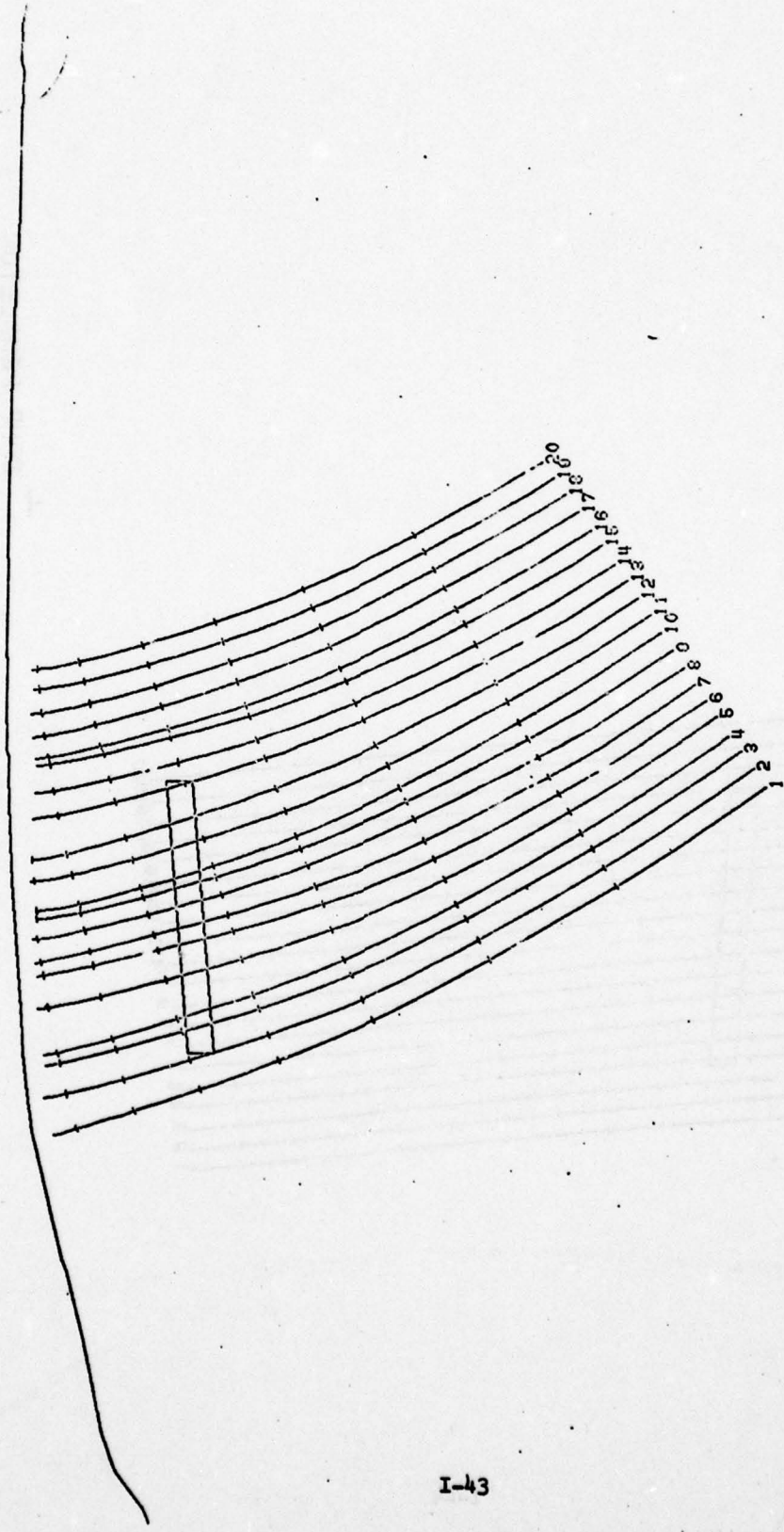




CAMP PENDLETON  
 WAVE PERIOD = 11.000 SECS  
 DEEPWATER AZIMUTH = 200.0 DEGREES

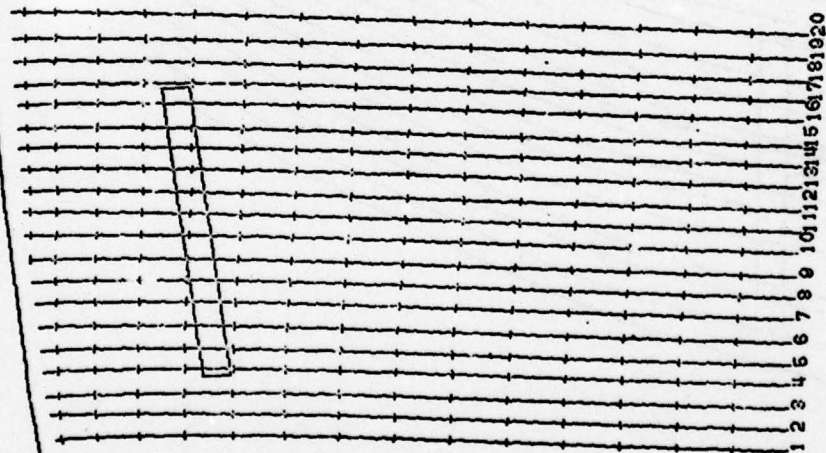


J. CAMP PENDLETON  
 WAVE PERIOD = 15.000 SECS  
 DESPINTER AZIMUTH = 203.0 DEGREES



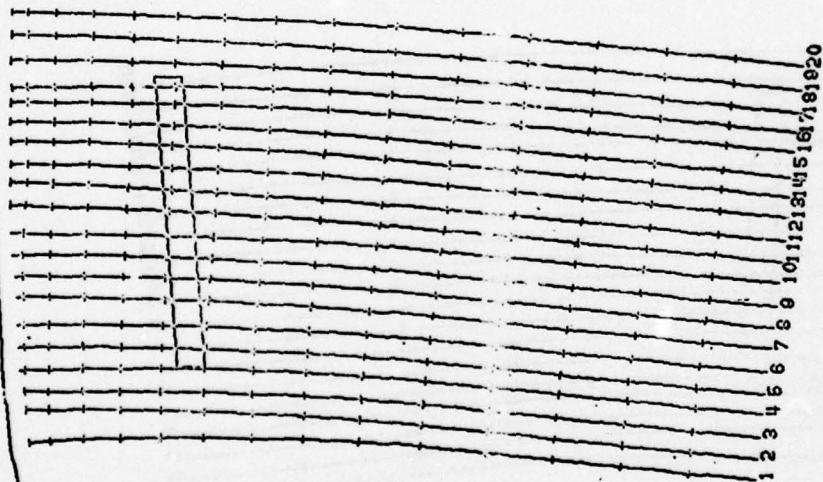
-L CAMP PENDLETON  
WAVE PERIOD = 19.000 SECS  
DEEPWATER DZ11:00H = 200.0 DEGREES

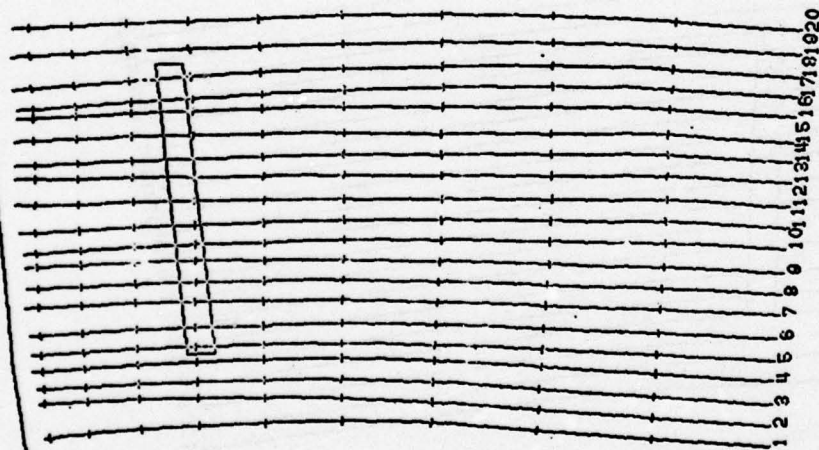




CAMP PENDLETON  
 WAVE PERIOD = 7.000 SECS  
 DEEPWATER AZIMUTH = 240.0 DEGREES

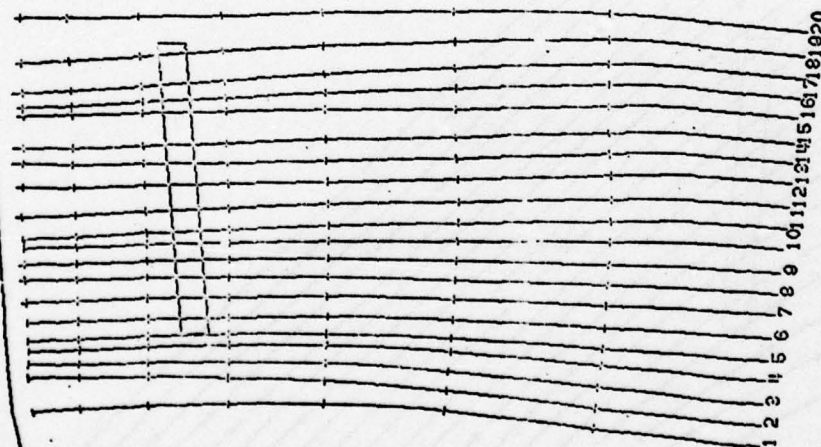
⊥ CAMP PENDLETON  
WAVE PERIOD = 11.000 SECS  
DEEPWATER DZMUTH = 240.0 DEGREES



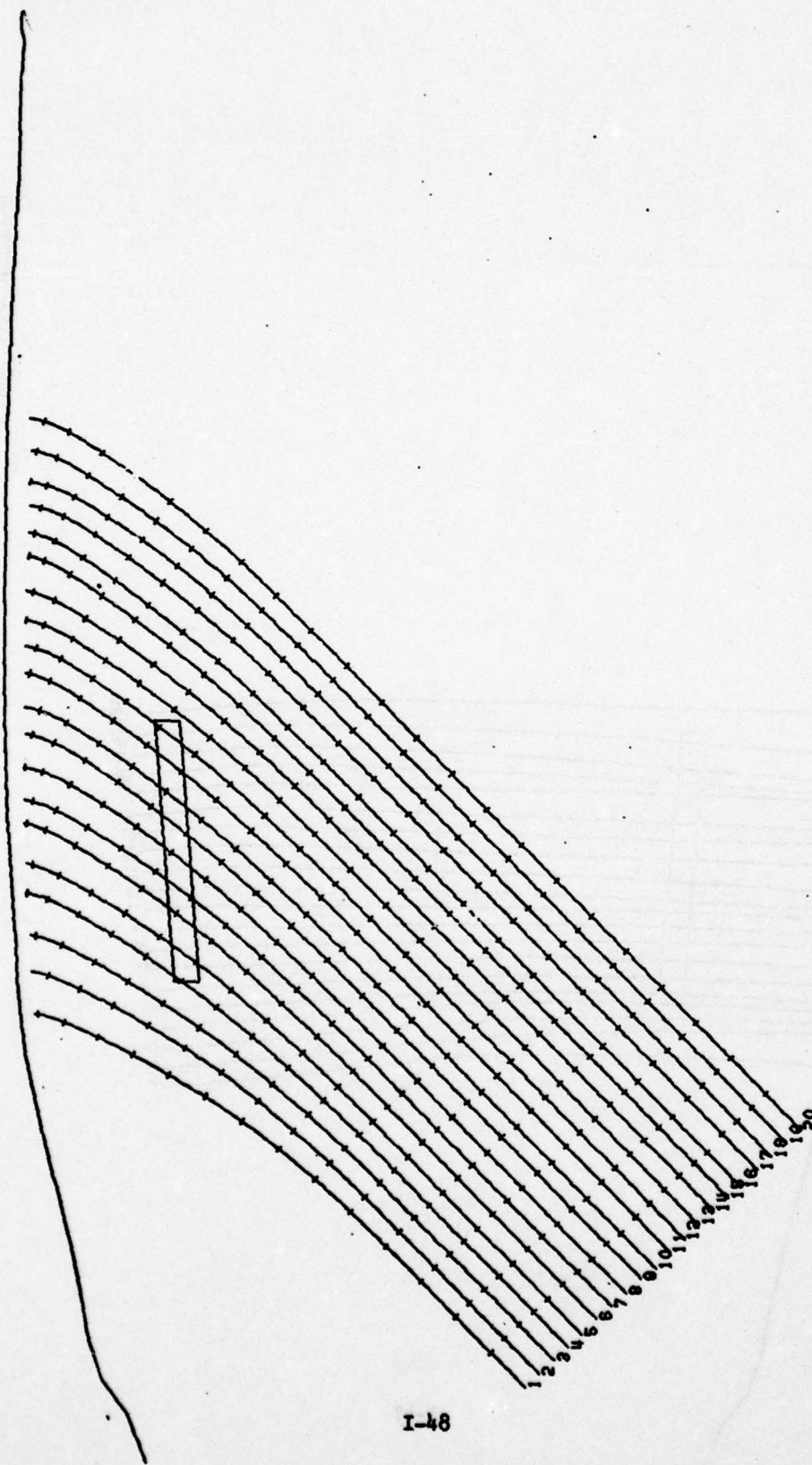


⊥ CAMP PENDLETON  
 HAVE PERIOD = 15.000 SECS  
 DEEPWATER AZIMUTH = 240.0 DEGREES

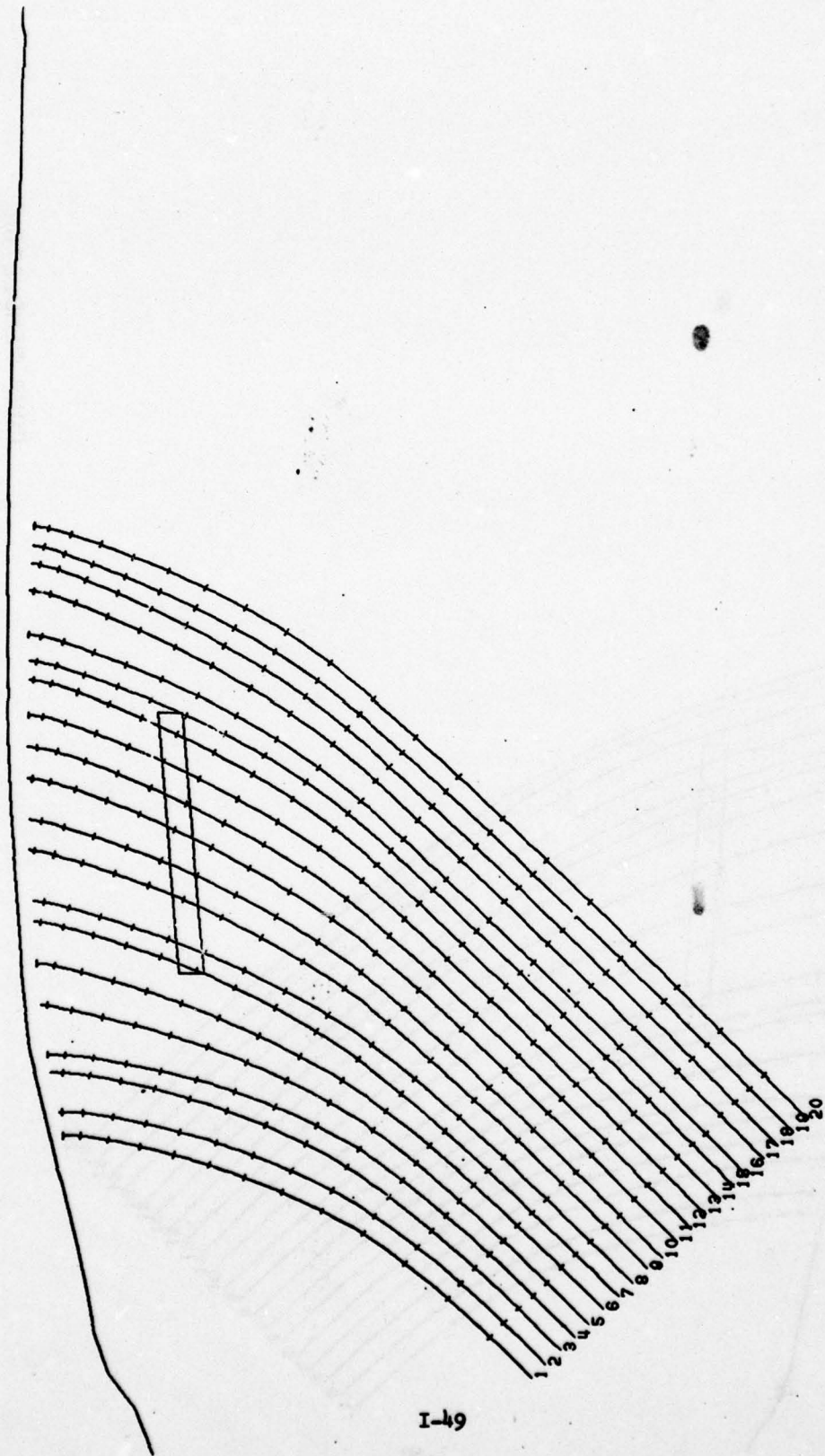




CAMP PENDLETON  
 WAVE PERIOD = 10.000 SECS  
 DEEPWATER AZIMUTH = 240.0 DEGREES



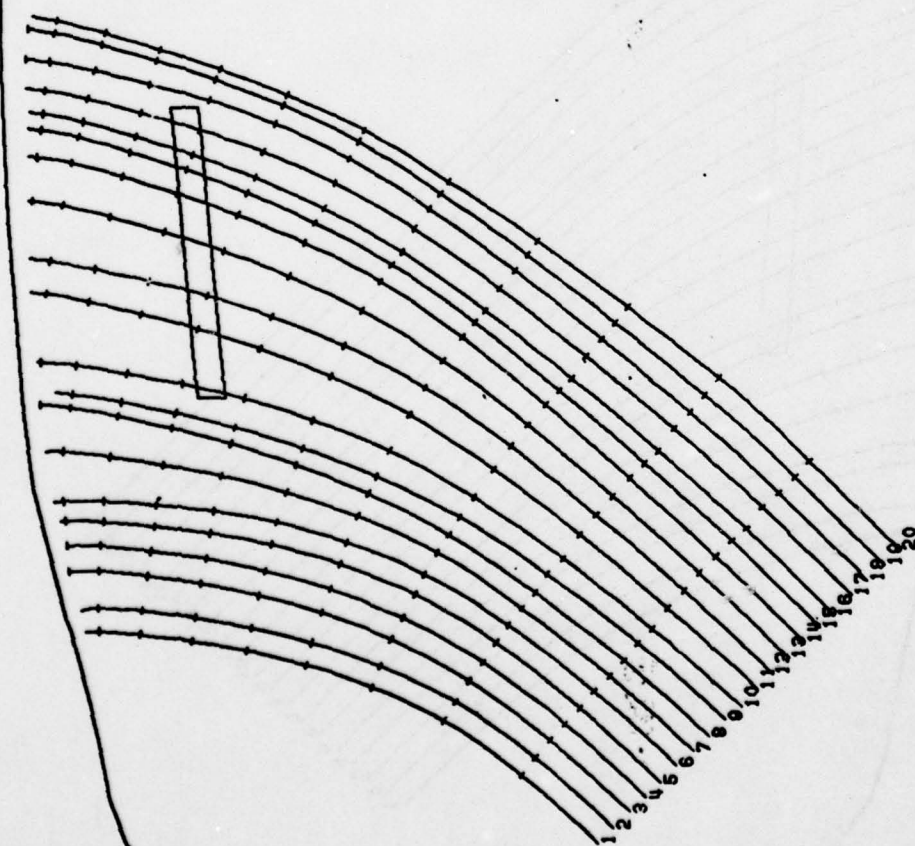
CAMP PENDLETON  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 280.0 DEGREES



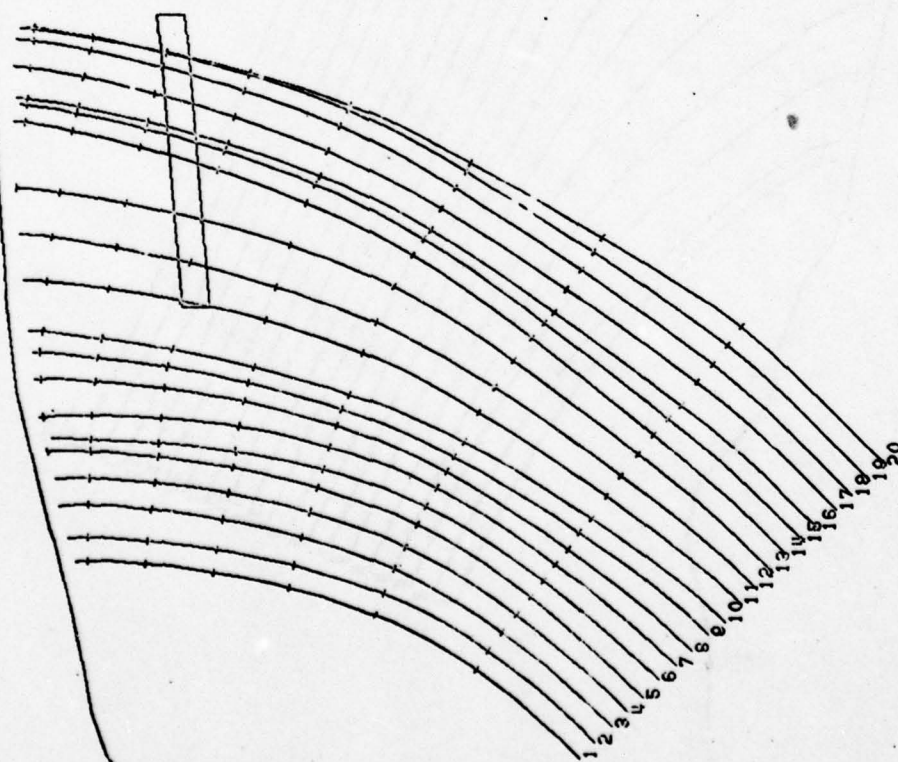
CAMP PENDLETON  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 280.0 DEGREES



CAMP PENDLETON  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 280.0 DEGREES

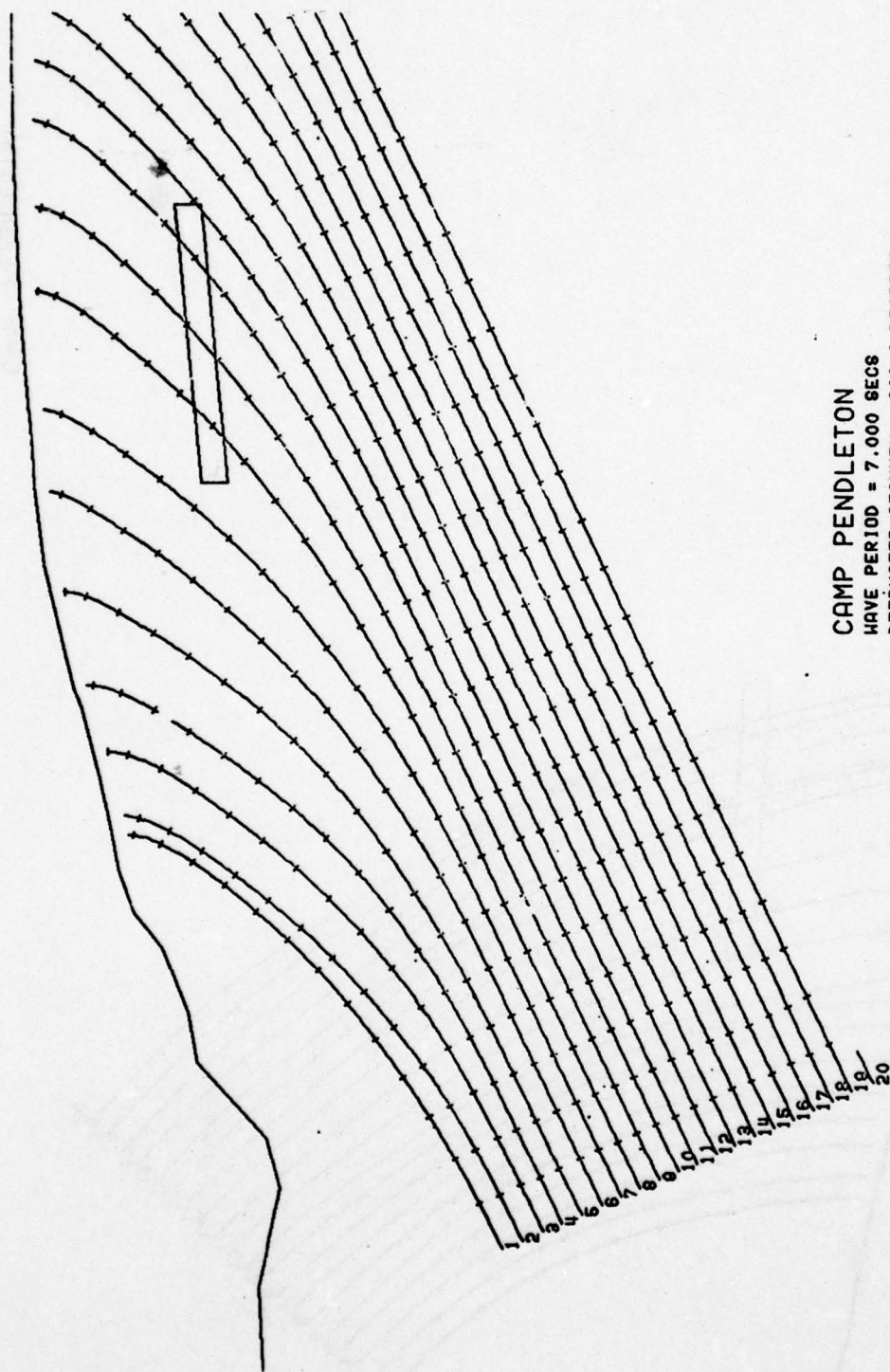


I-50



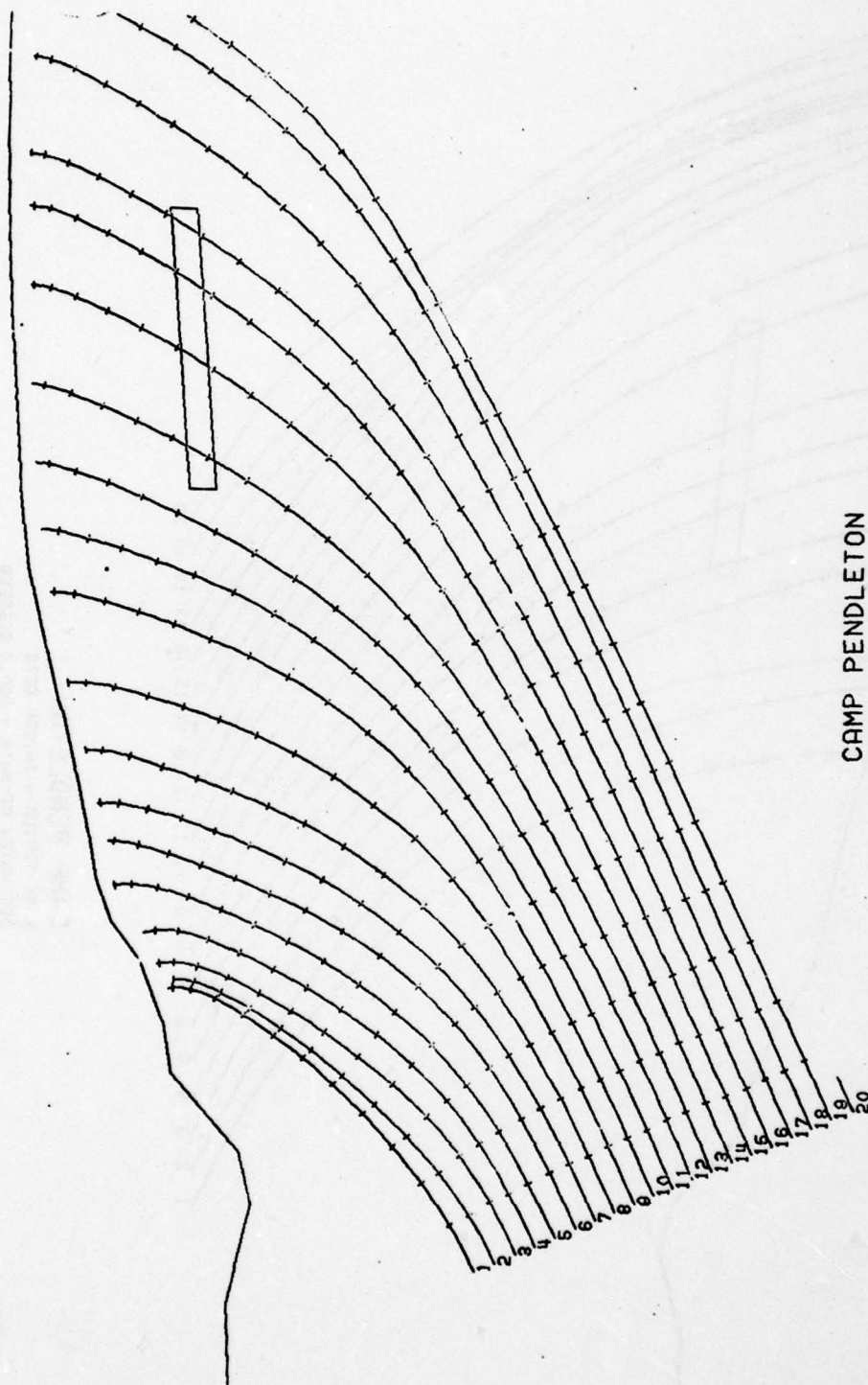
I-51

CAMP PENDLETON  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 280.0 DEGREES

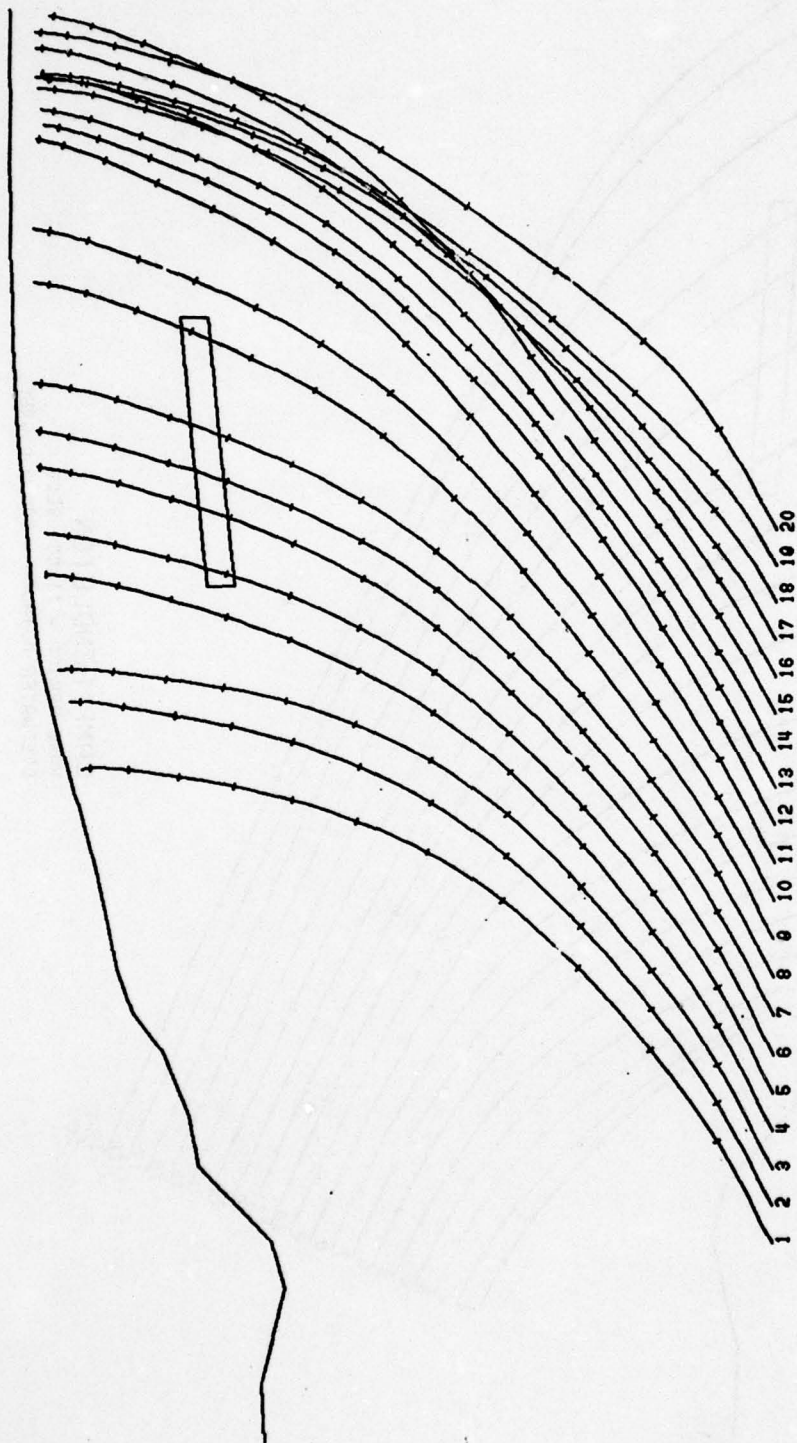


CAMP PENDLETON  
HAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 300.0 DEGREES

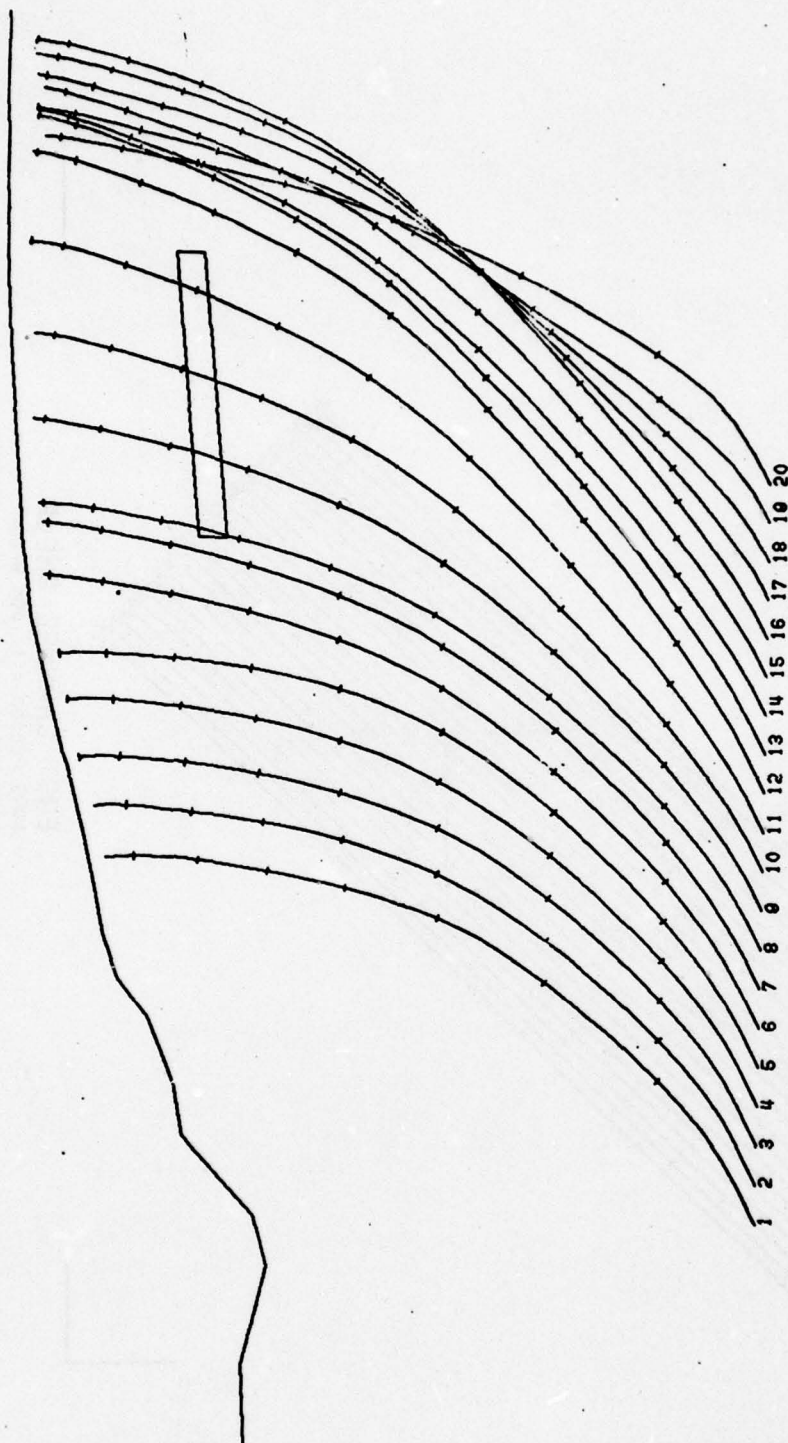




CAMP PENDLETON  
WAVE PERIOD = 11.000 SECS  
DEEPMETER AZIMUTH = 340.0 DEGREES

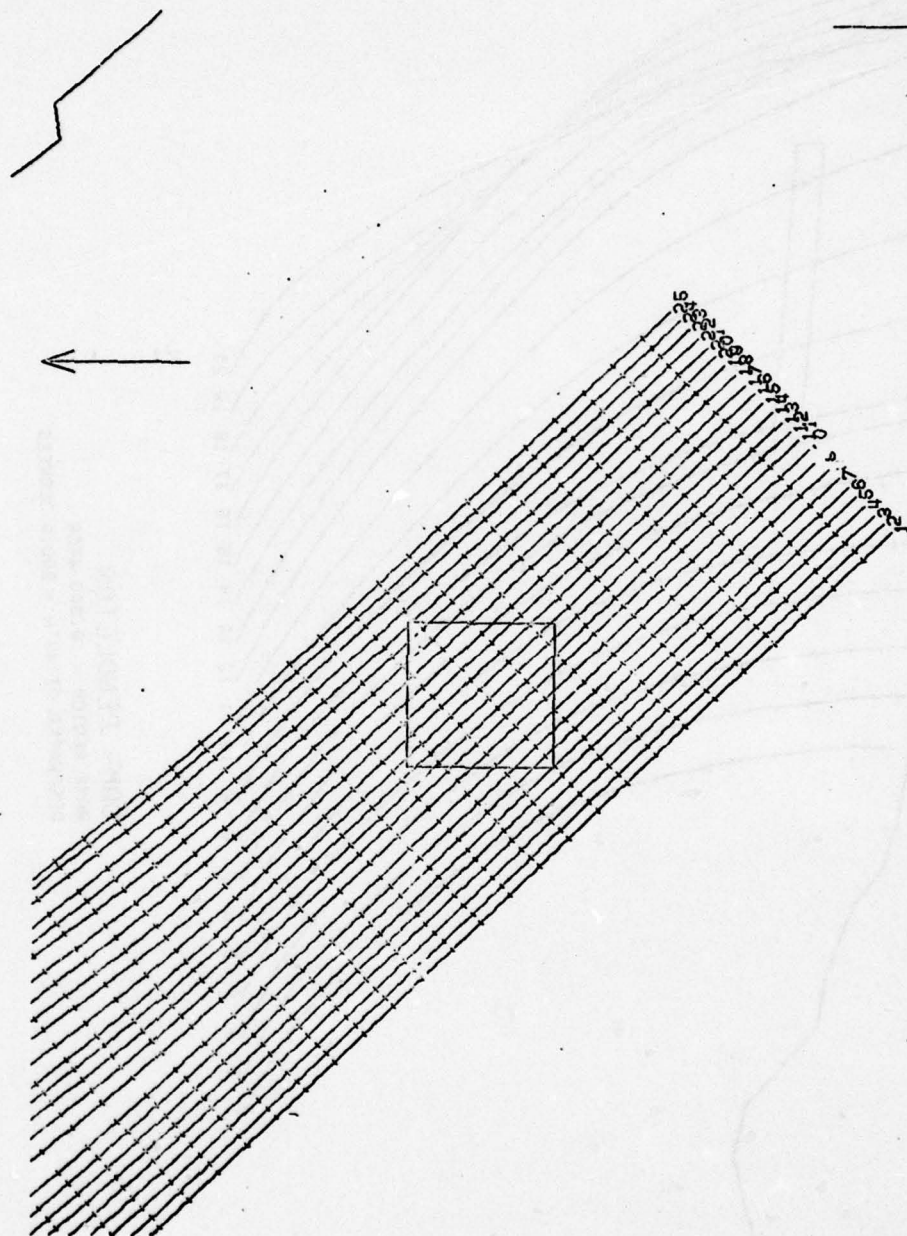


CAMP PENDLETON  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 300.0 DEGREES

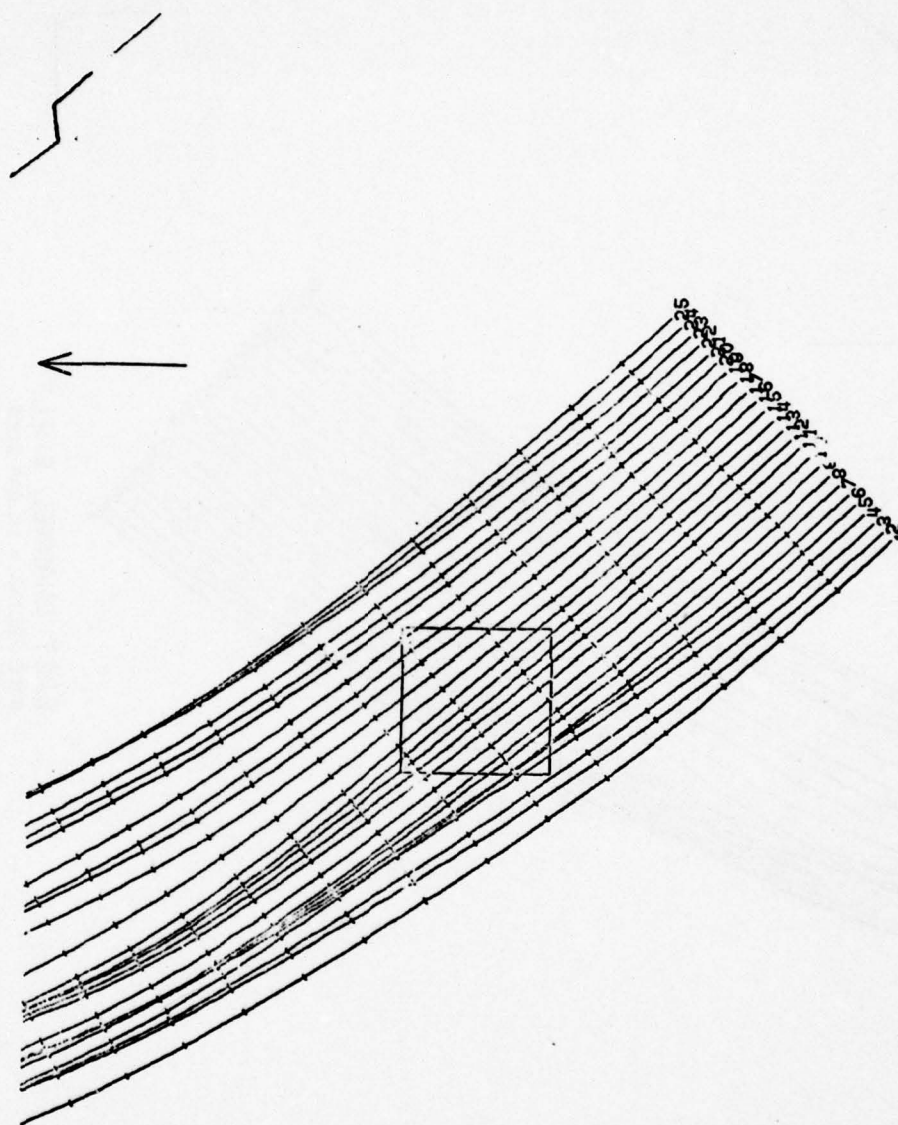


CAMP PENDLETON  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 300.0 DEGREES

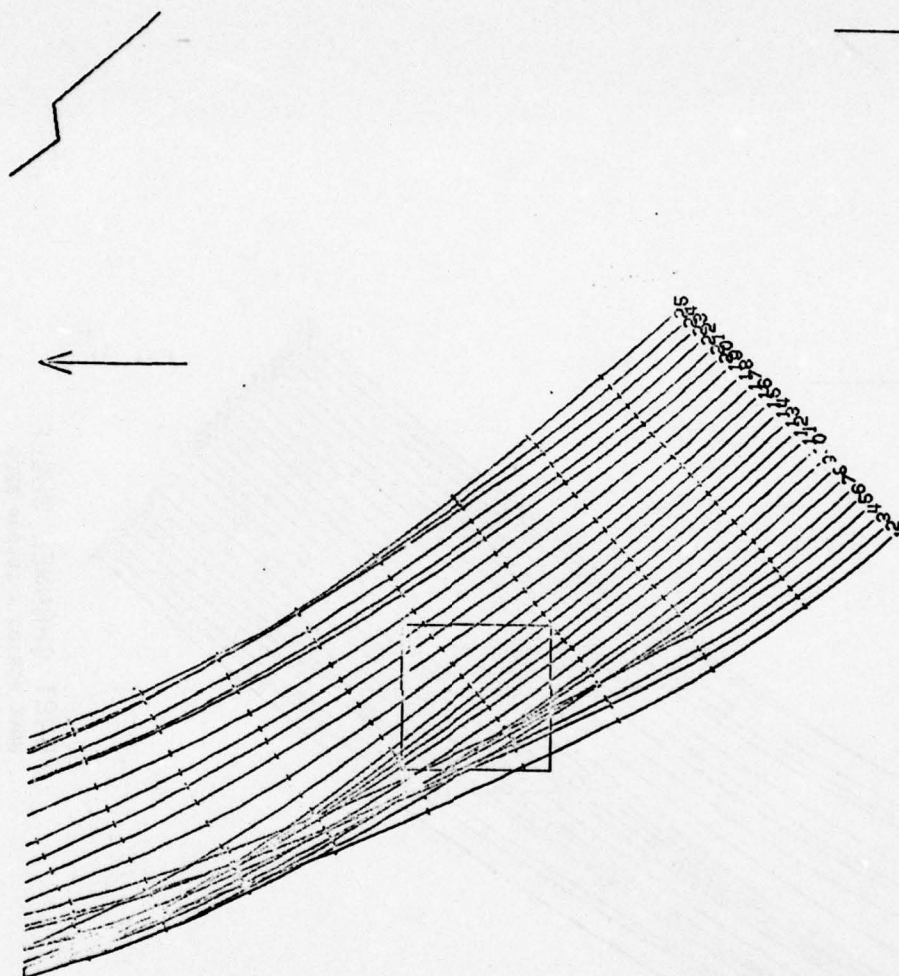




EAST CHANNEL SHELF  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 135.5 DEGREES

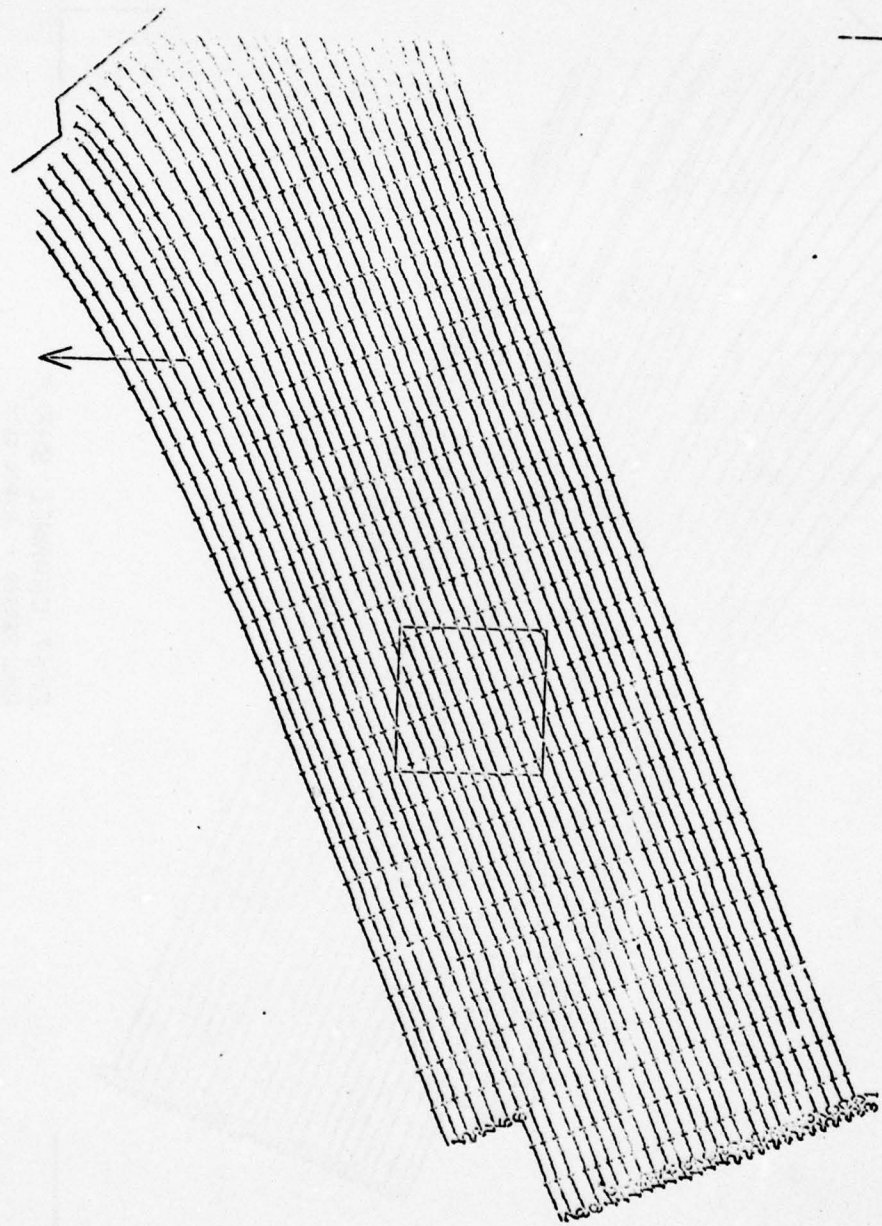


EAST CHANNEL SHELF  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 135.5 DEGREES

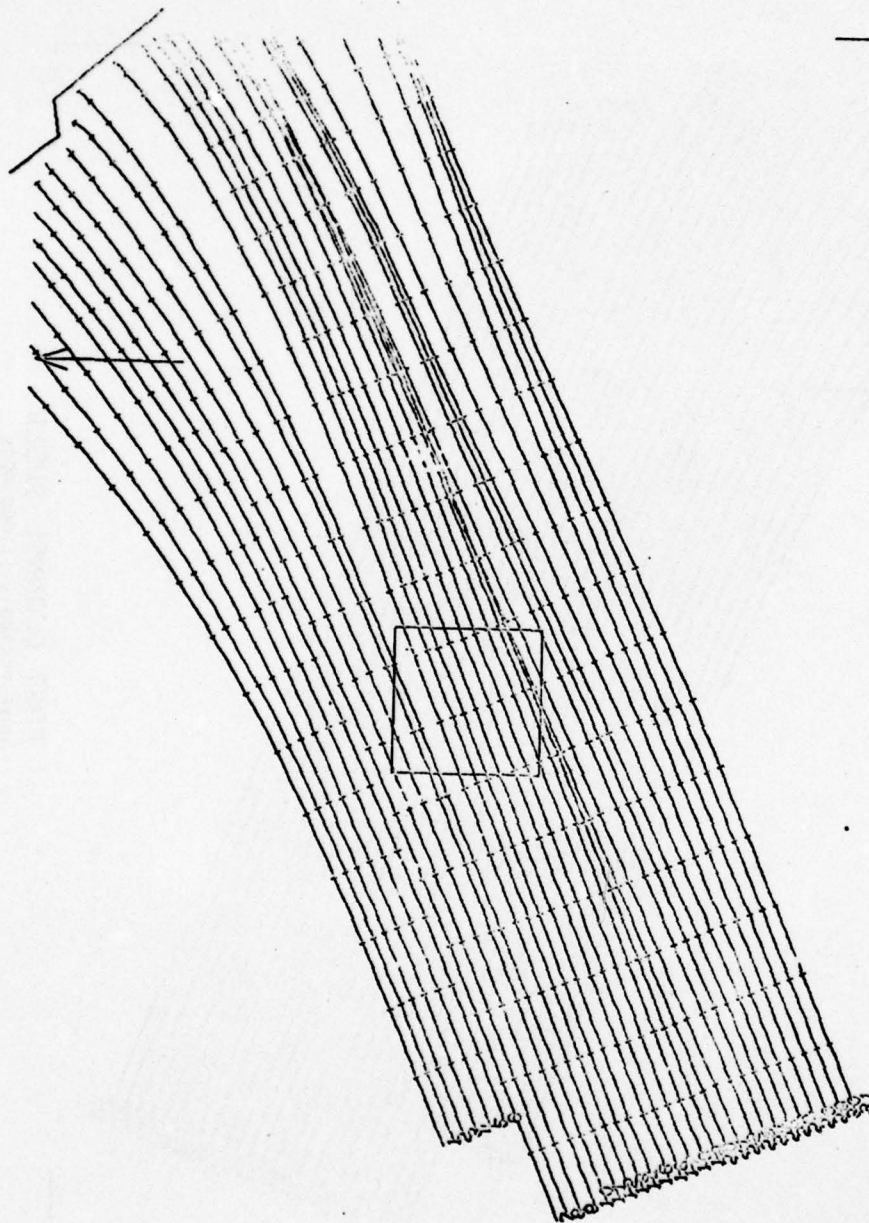


EAST CHANNEL SHELF  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 135.5 DEGREES

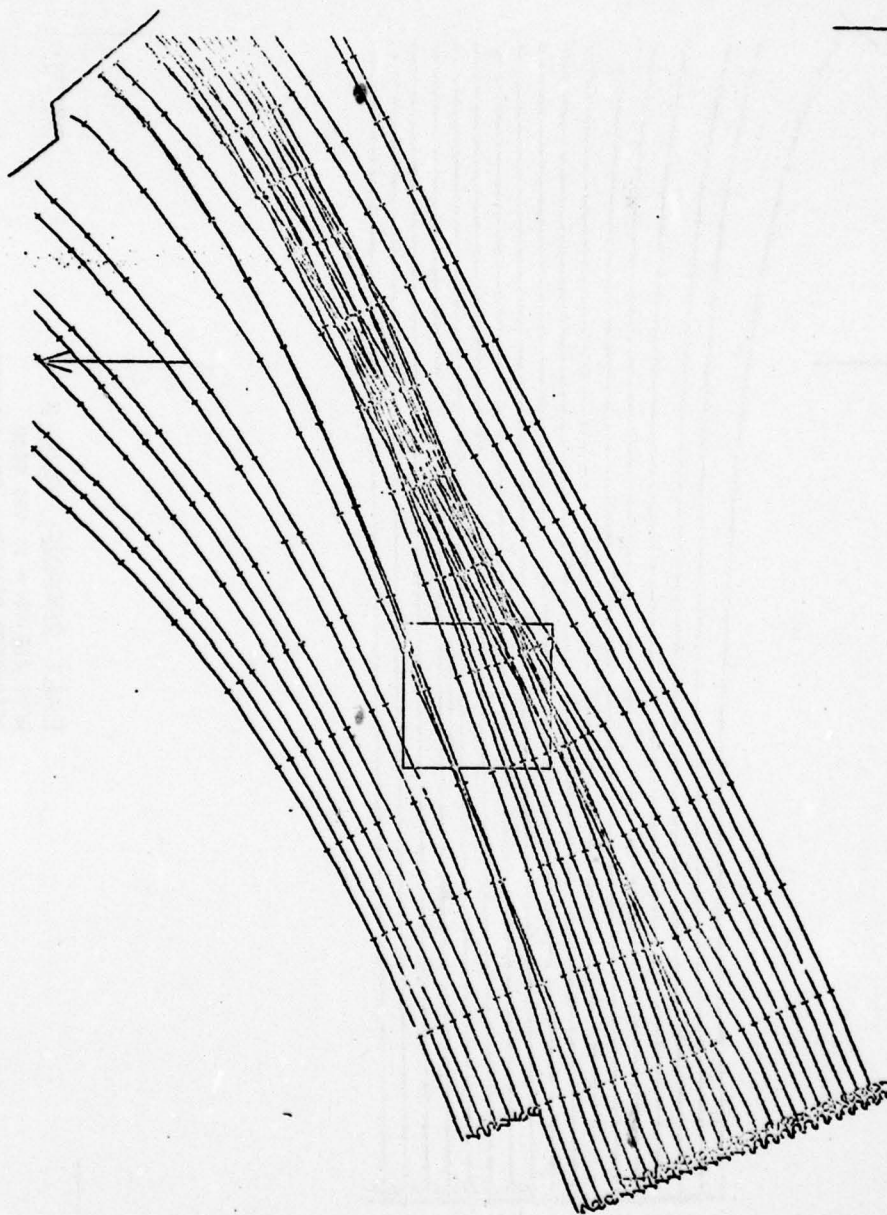




EAST CHANNEL SHELF  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 247.6 DEGREES

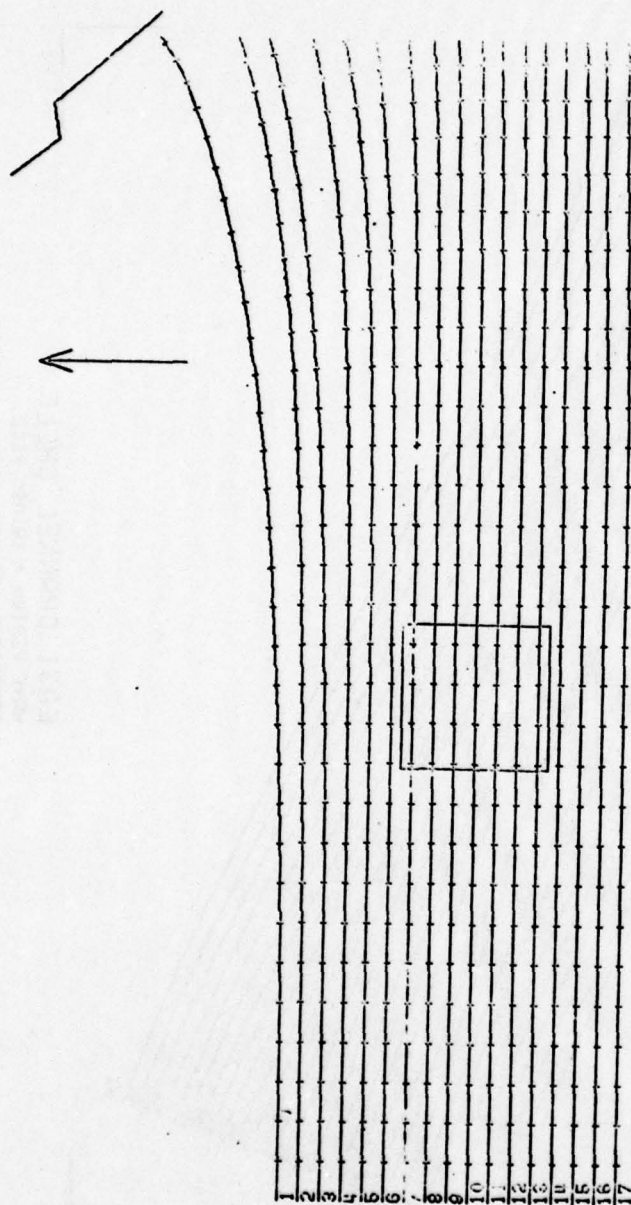


EAST CHANNEL SHELF  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 247.6 DEGREES

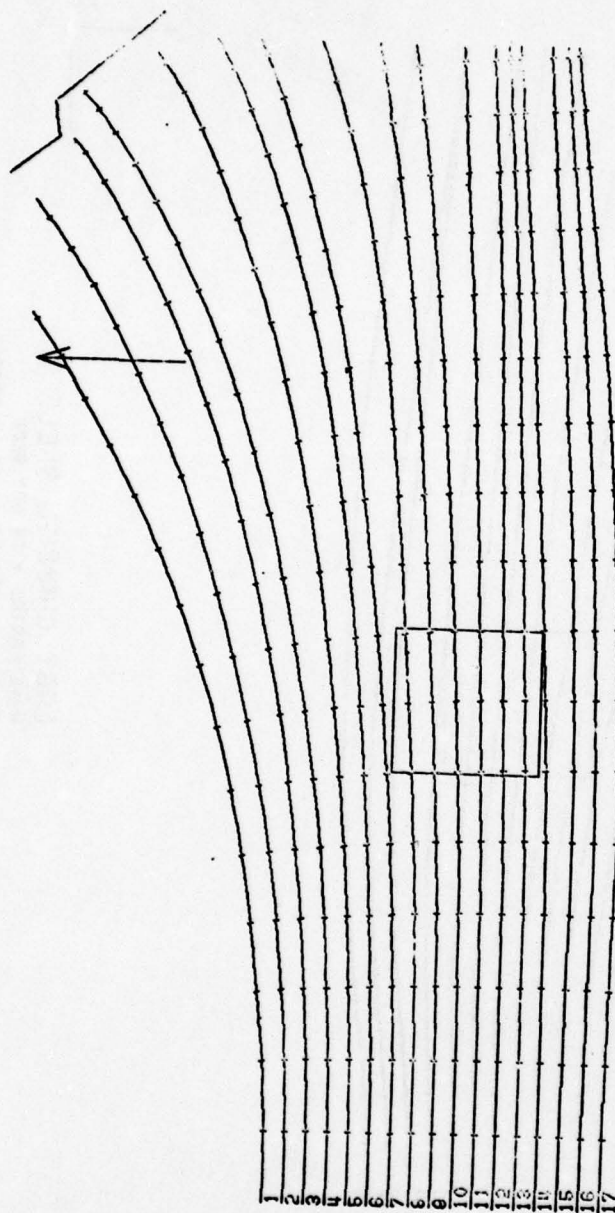


EAST CHANNEL SHELF  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 247.5 DEGREES

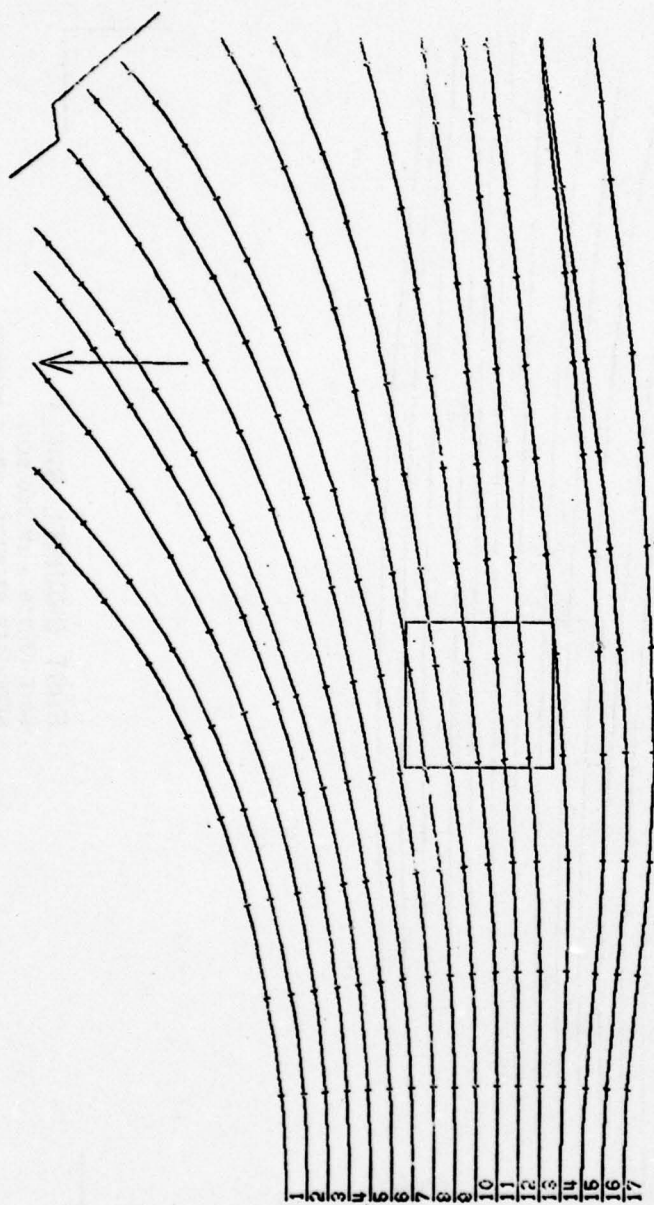




EAST CHANNEL SHELF  
 WAVE PERIOD = 11.000 SECS  
 DEEPWATER AZIMUTH = 270.0 DEGREES

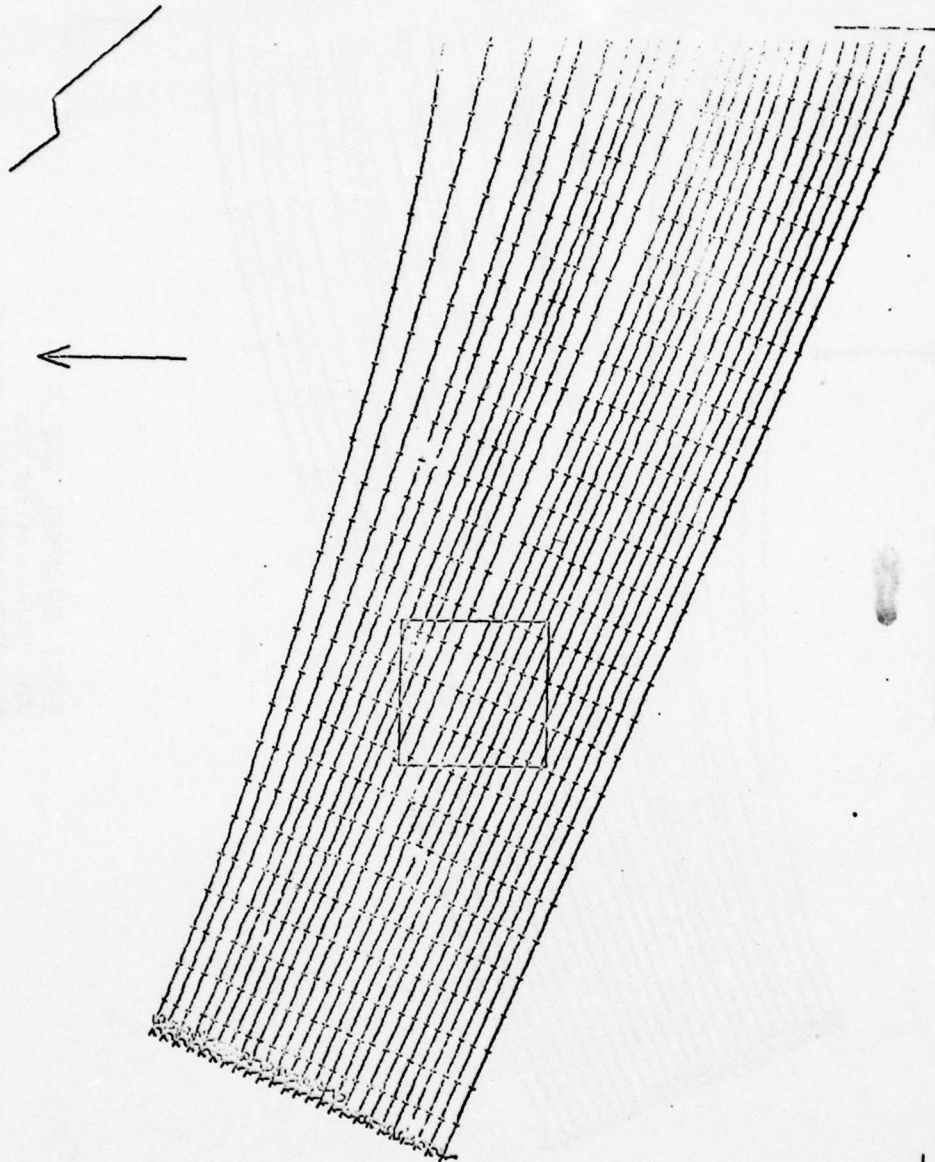


EAST CHANNEL SHELF  
 WAVE PERIOD = 15.000 SECS  
 DEEPWATER AZIMUTH = 270.0 DEGREES

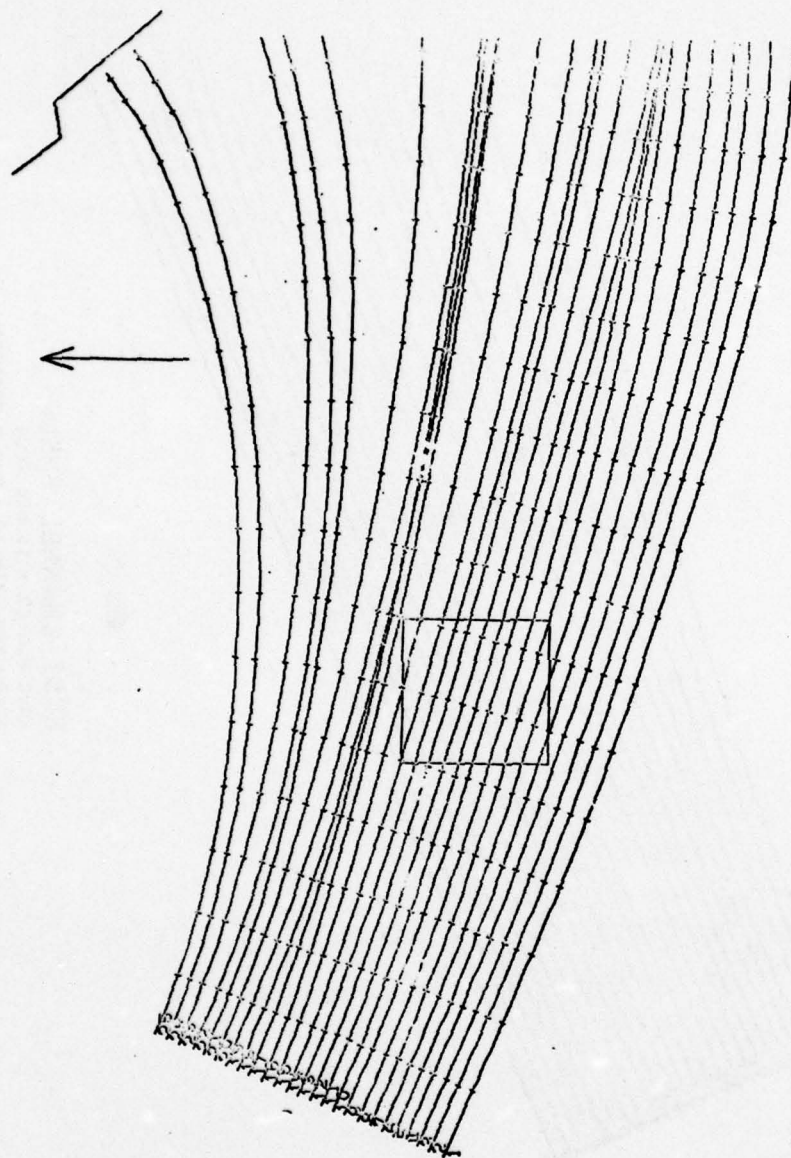


EAST CHANNEL SHELF  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 270.0 DEGREES

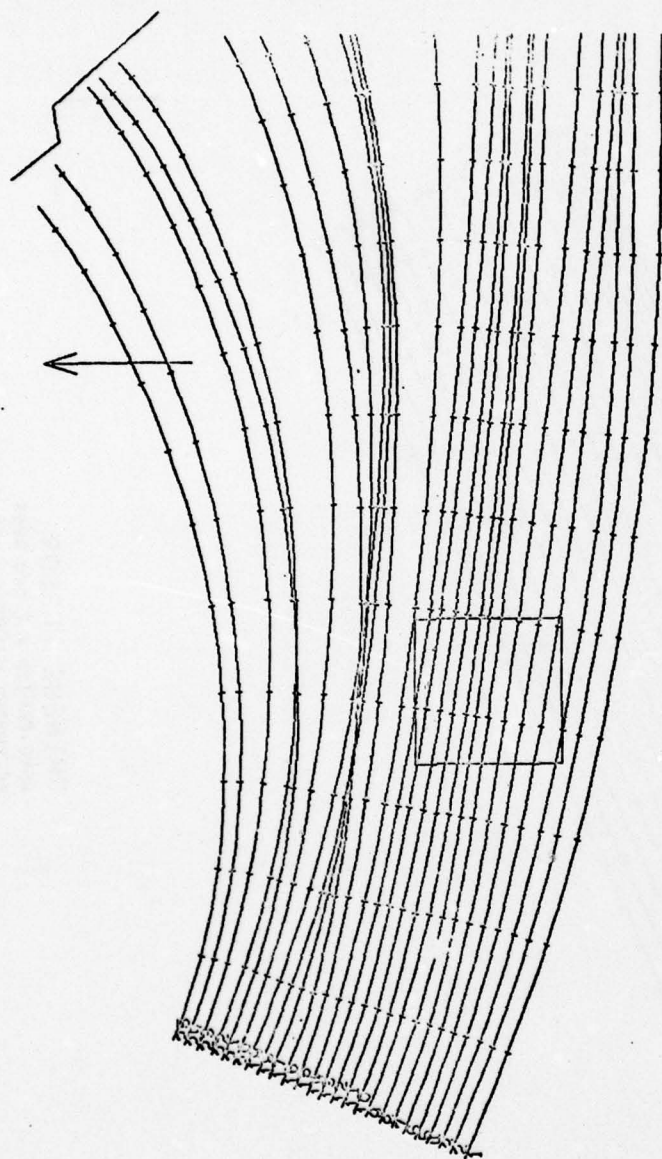




EAST CHANNEL SHELF  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 292.5 DEGREES

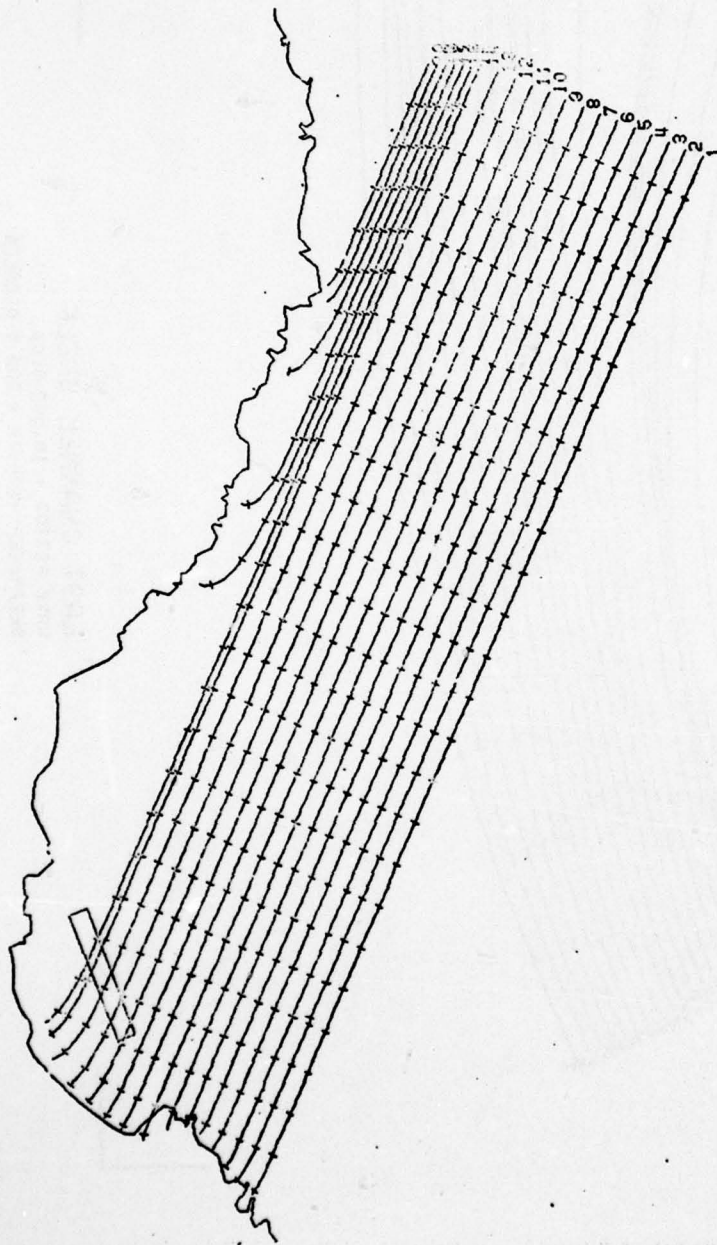


EAST CHANNEL SHELF  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 202.5 DEGREES

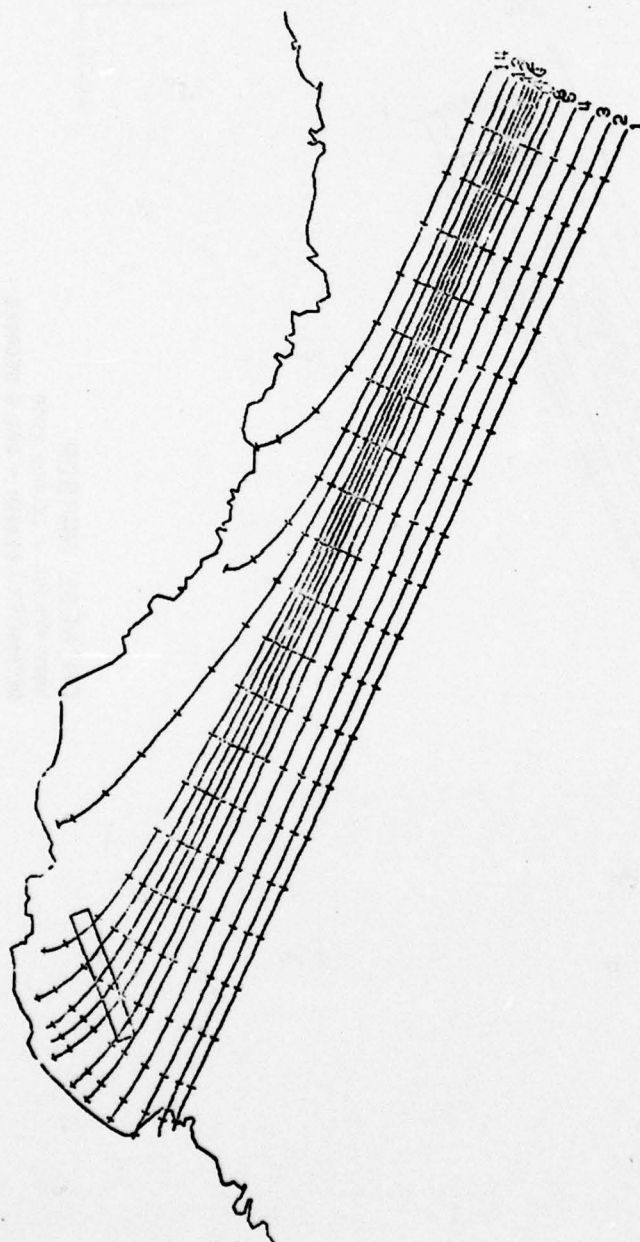


EAST CHANNEL SHELF  
WAVE PERIOD = 18.000 SECS  
DEEPWATER AZIMUTH = 292.5 DEGREES

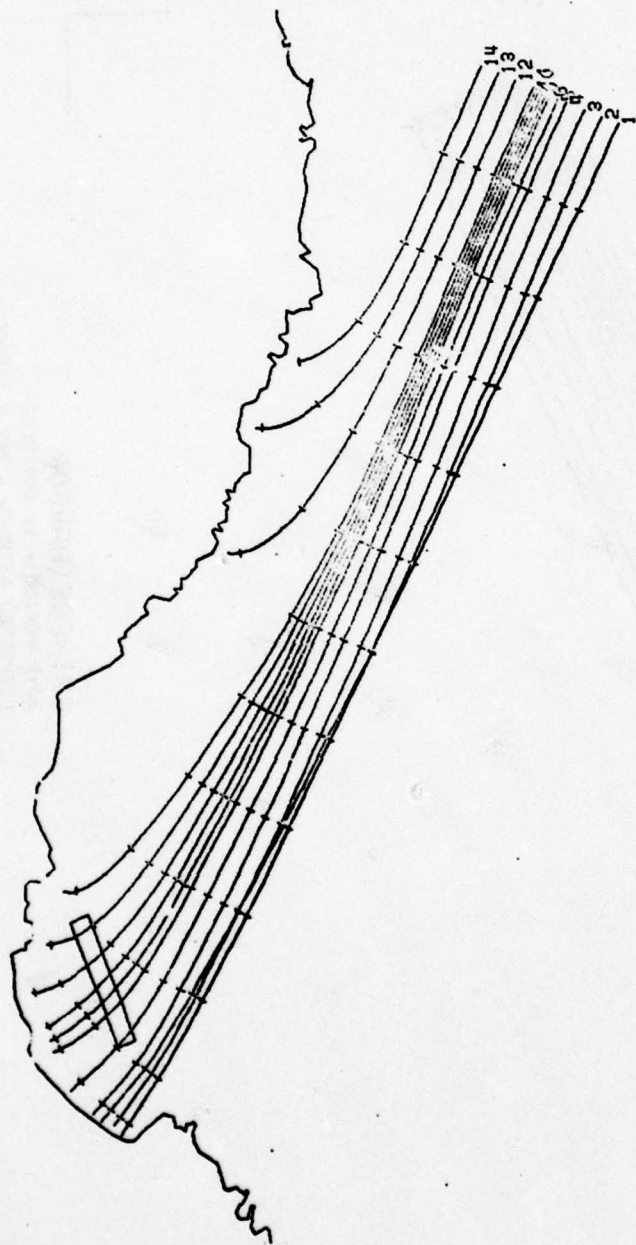




CHINESE HARBOR  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 202.5 DEGREES

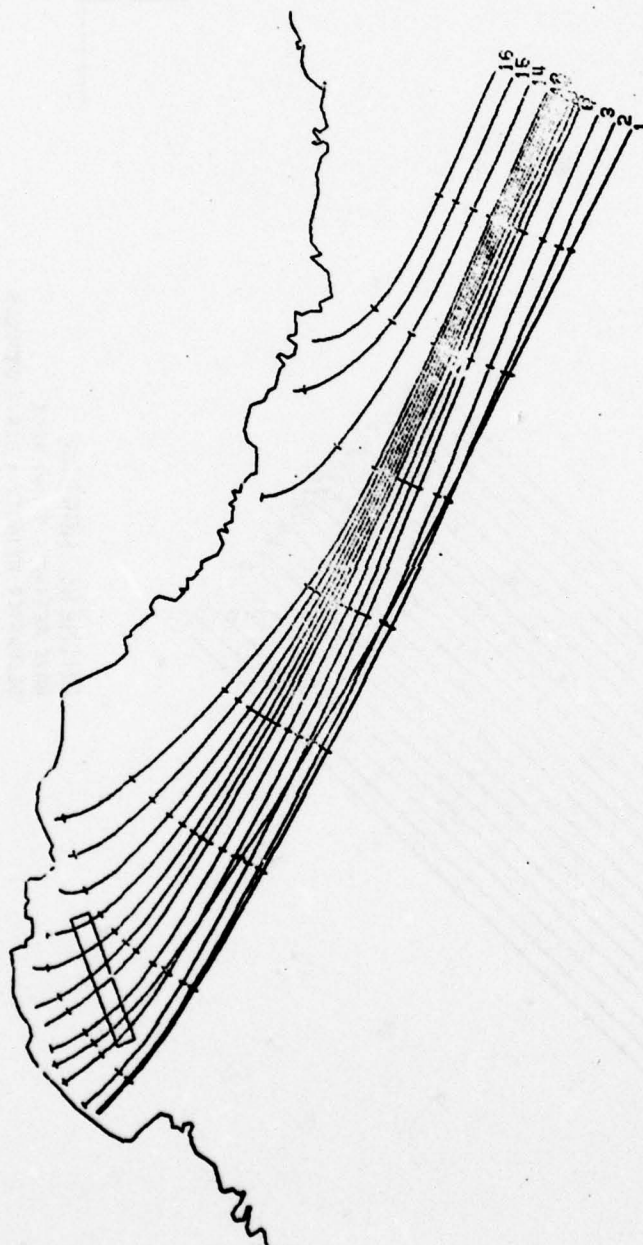


CHINESE HARBOR  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 292.5 DEGREES

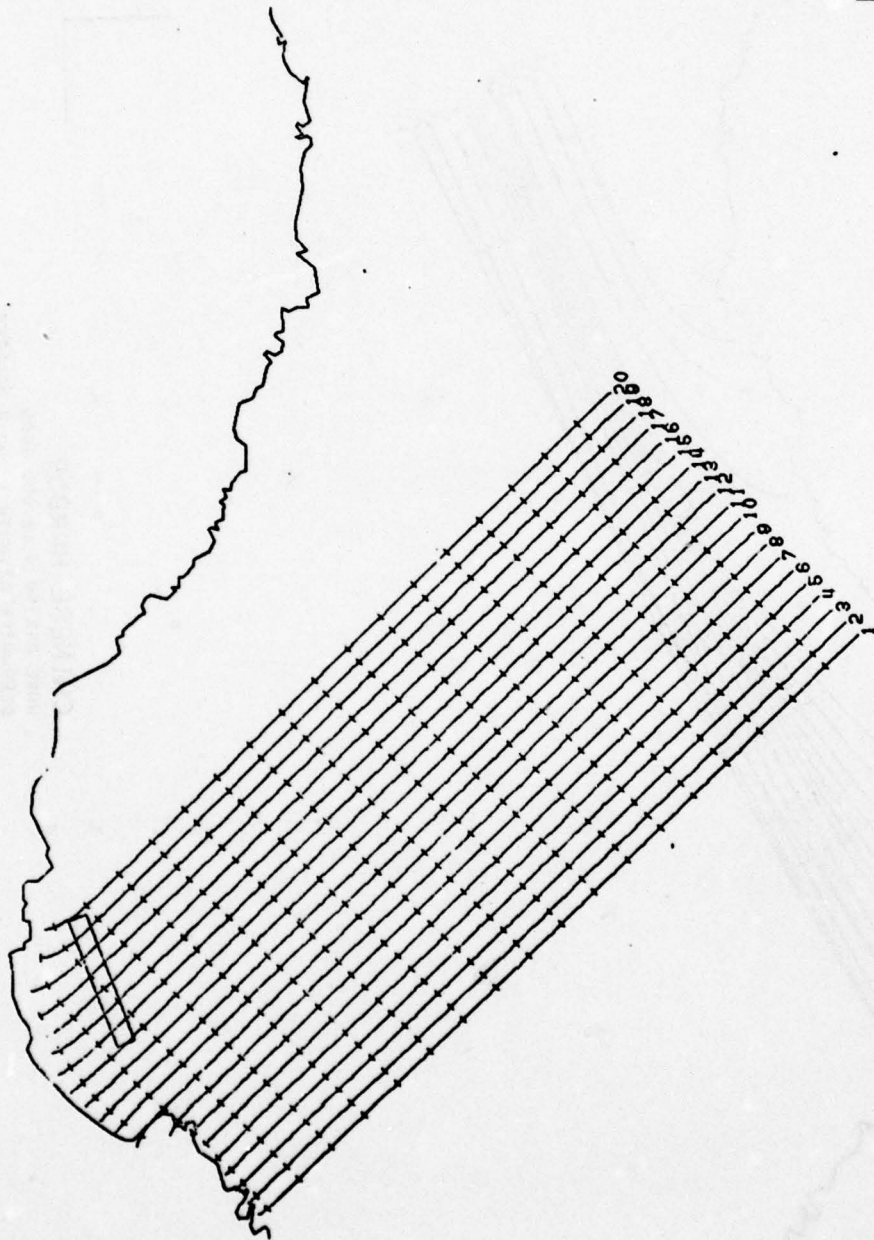


CHINESE HARBOR  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 202.5 DEGREES

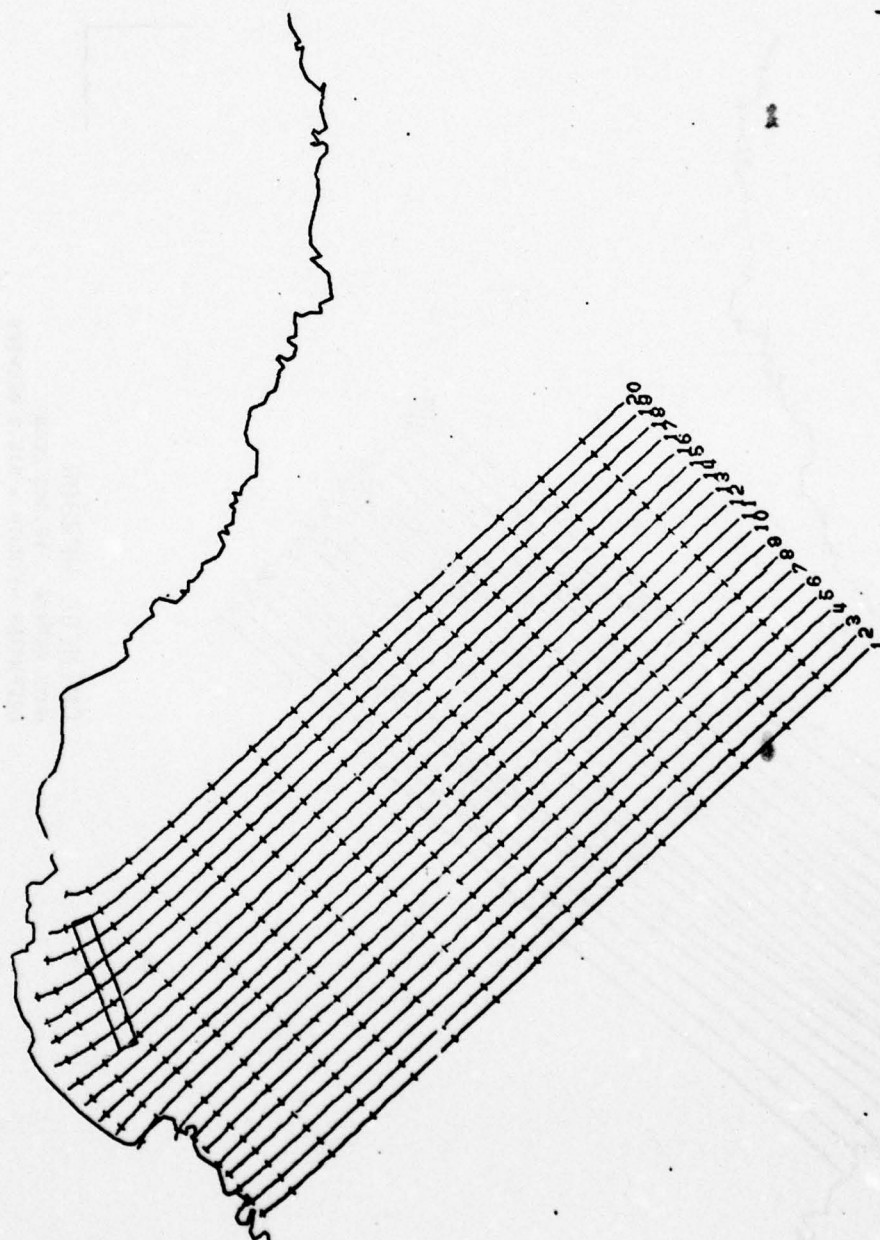




CHINESE HARBOR  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 202.6 DEGREES

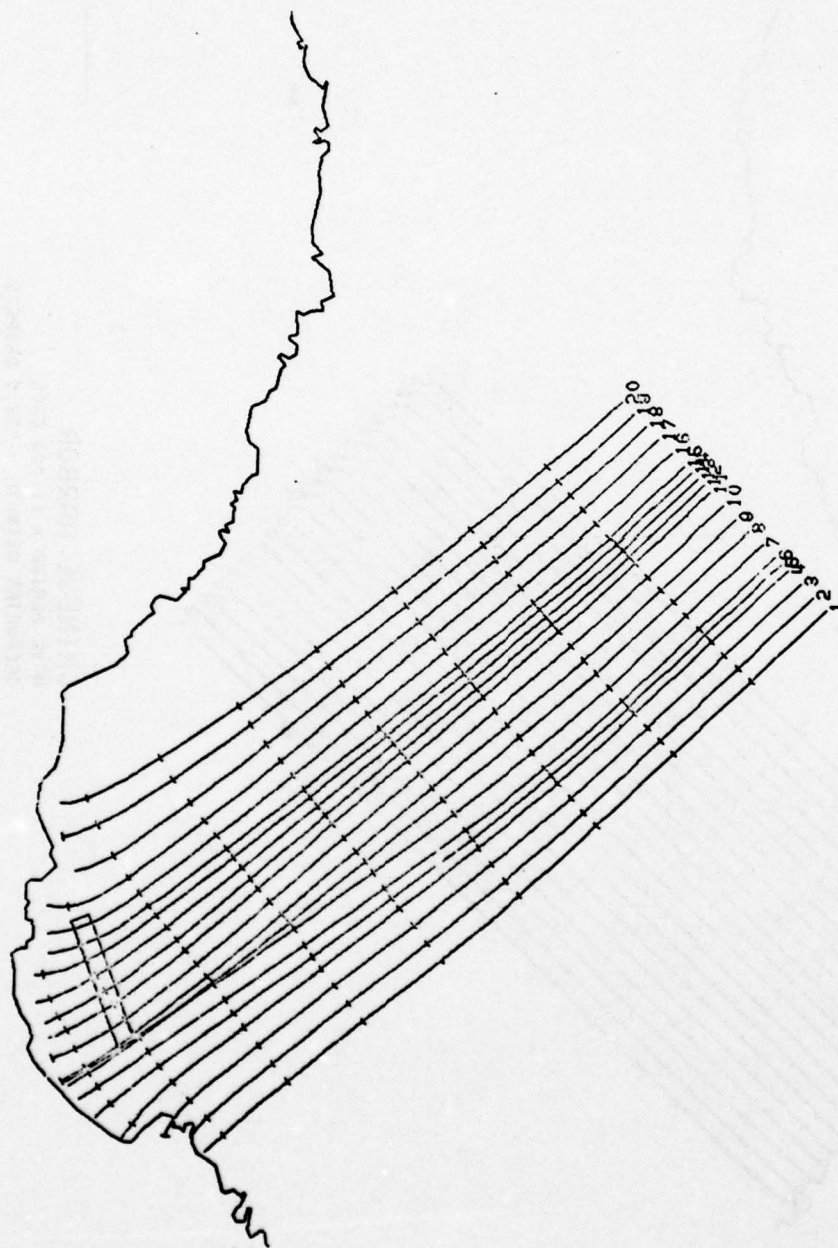


CHINESE HARBOR  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 315.0 DEGREES

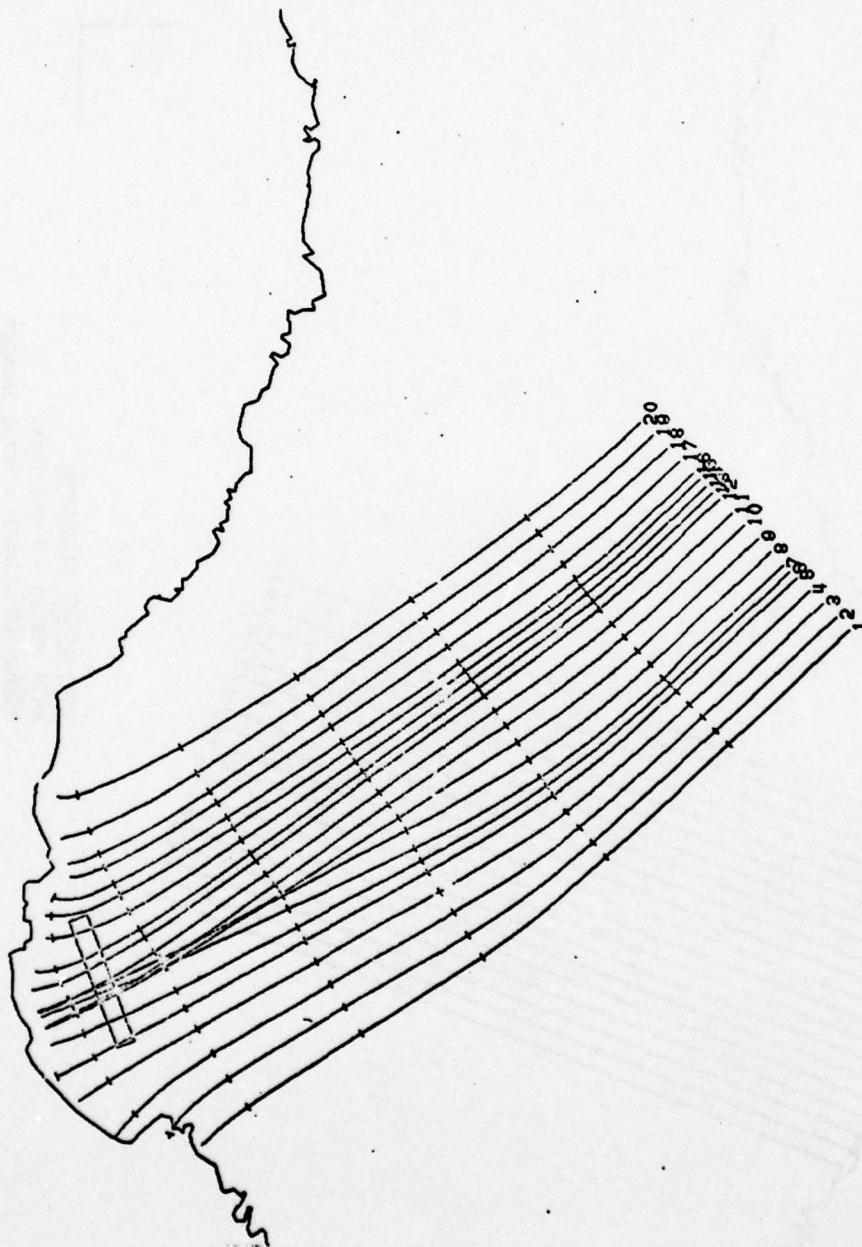


CHINESE HARBOR  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 315.0 DEGREES

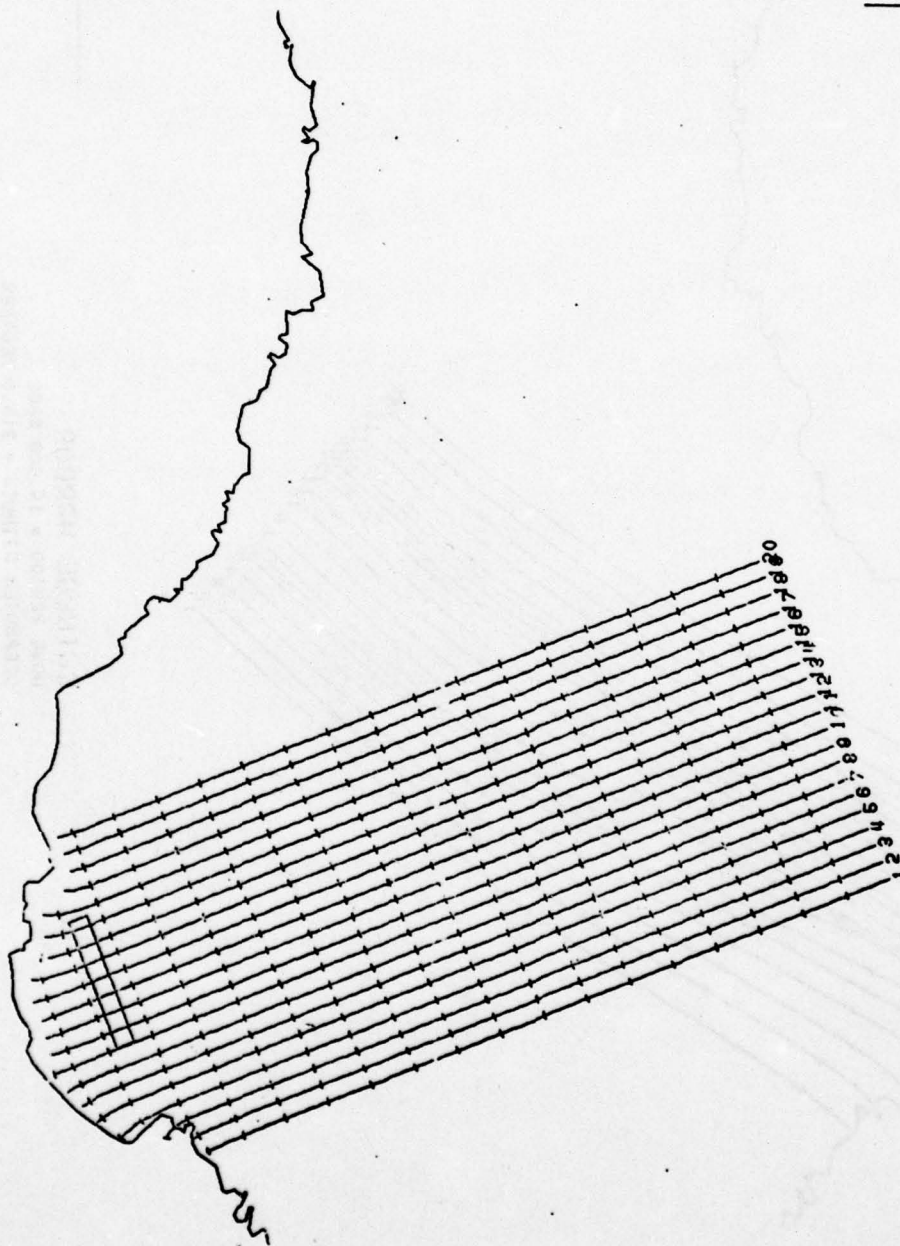




CHINESE HARBOR  
 WAVE PERIOD = 15.000 SECS  
 DEEPWATER AZIMUTH = 315.0 DEGREES

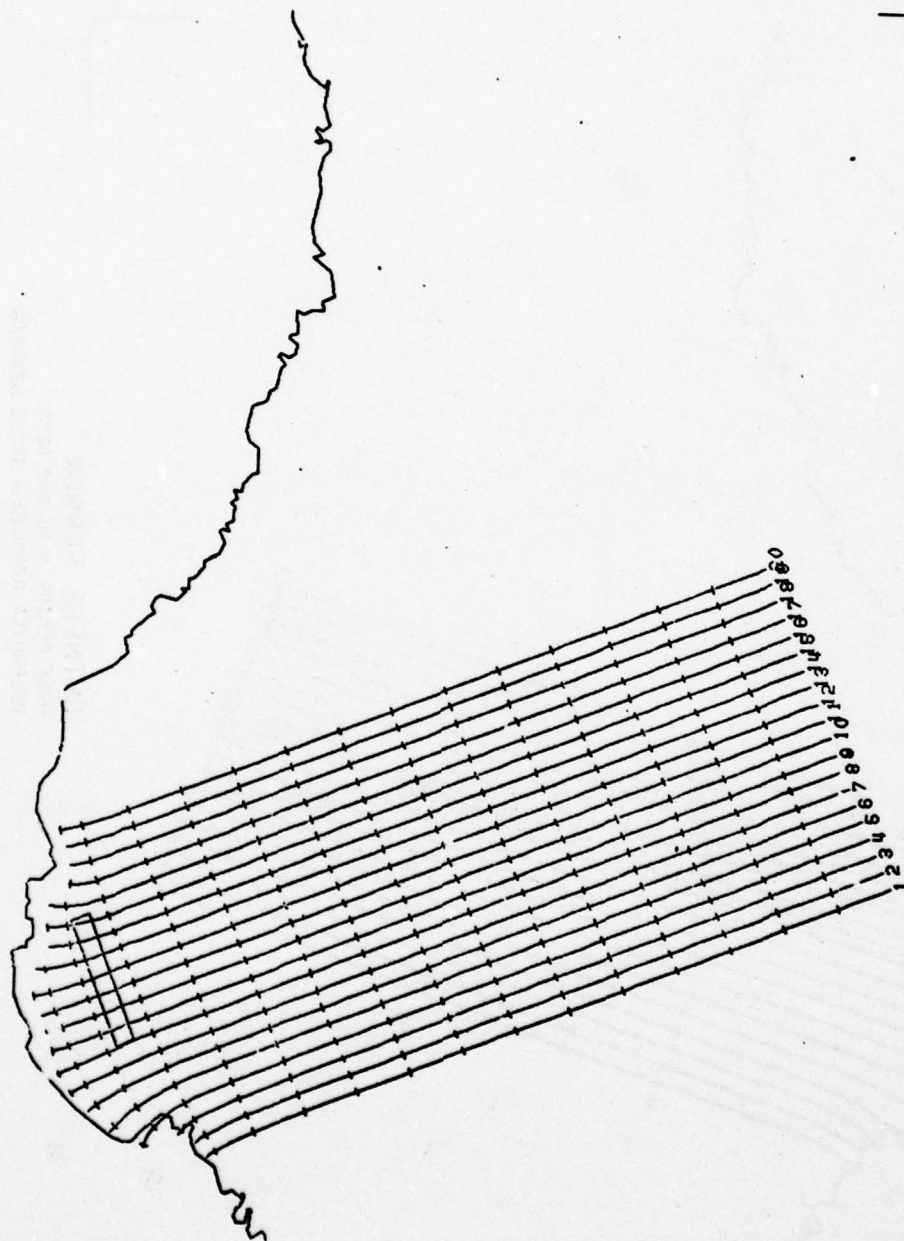


CHINESE HARBOR  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 315.0 DEGREES

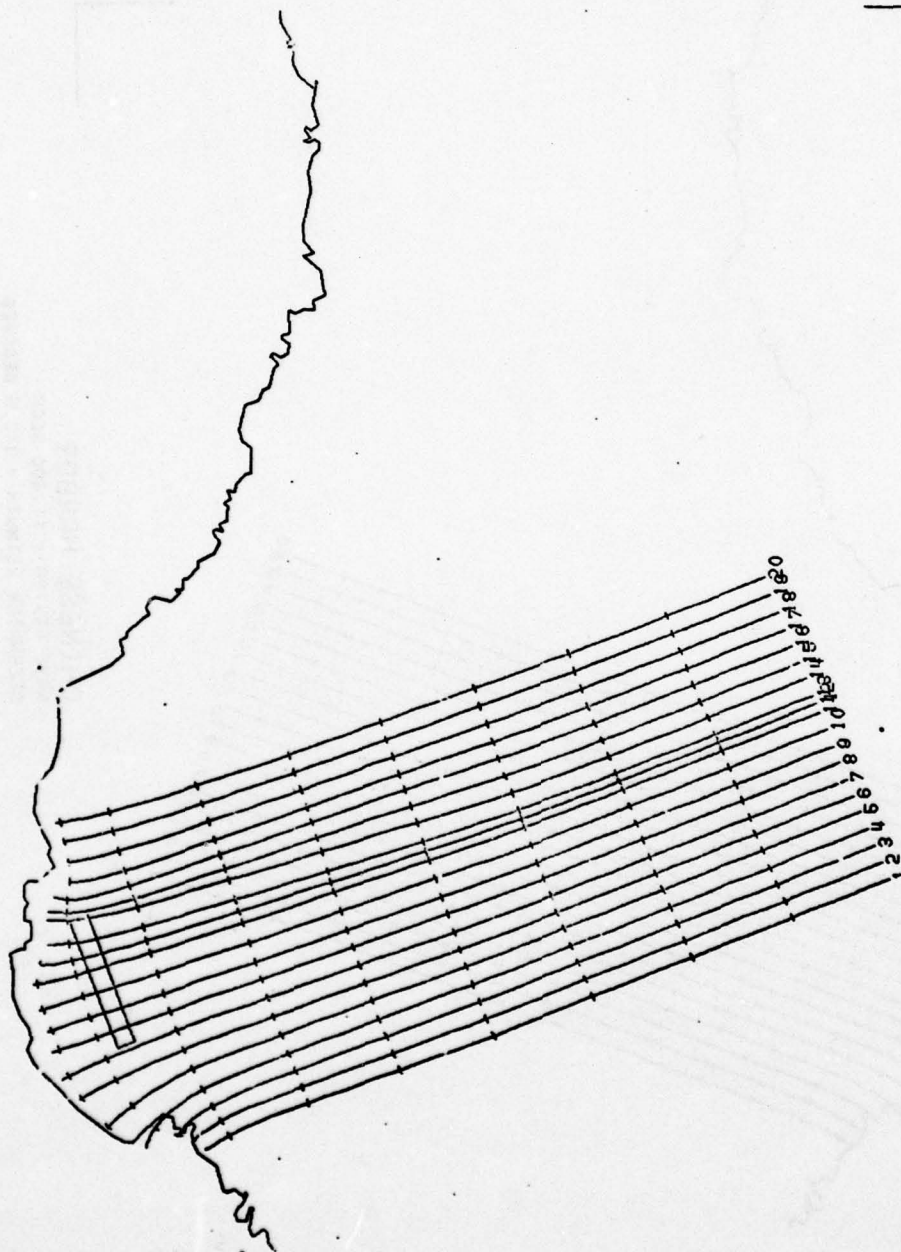


CHINESE HARBOR  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 337.5 DEGREES

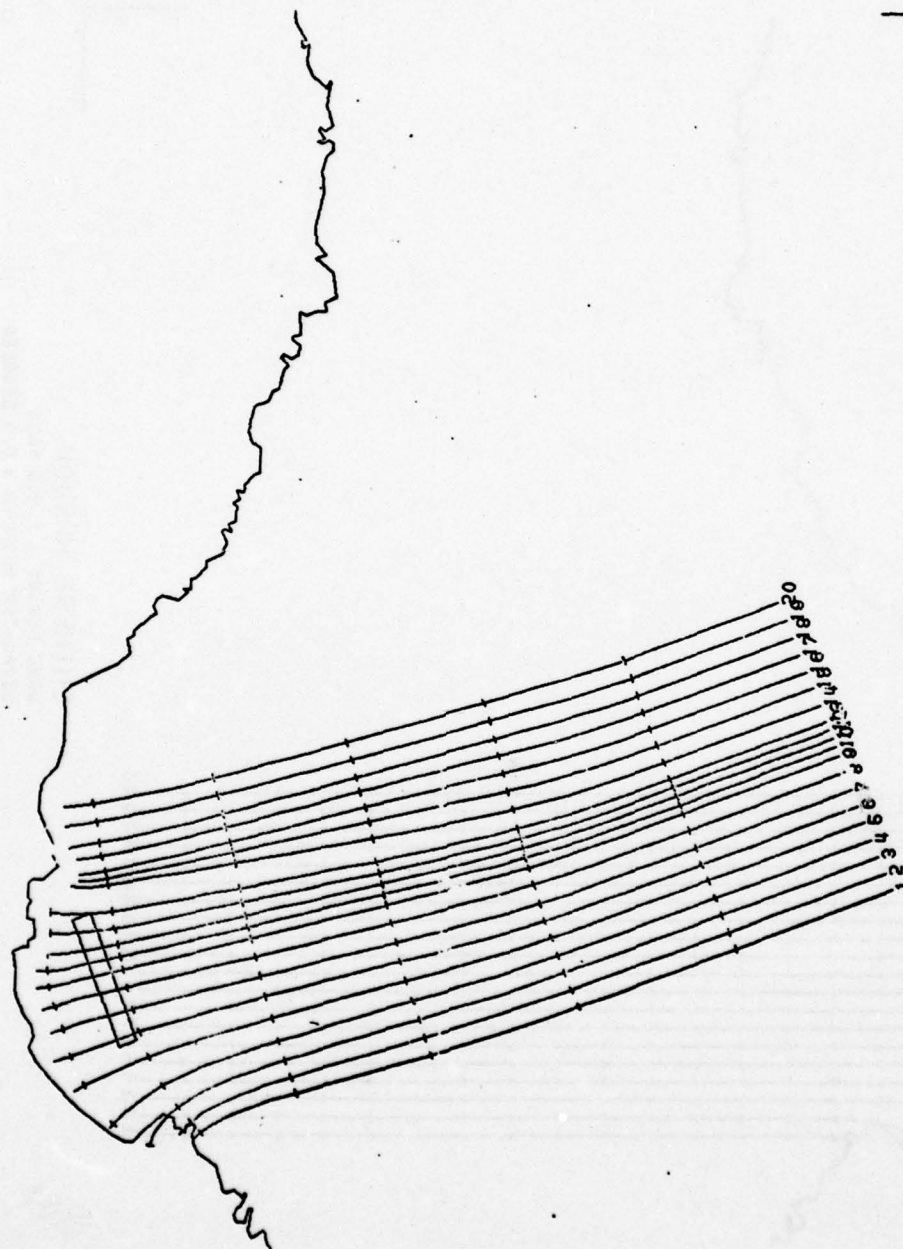




CHINESE HARBOR  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 337.5 DEGREES

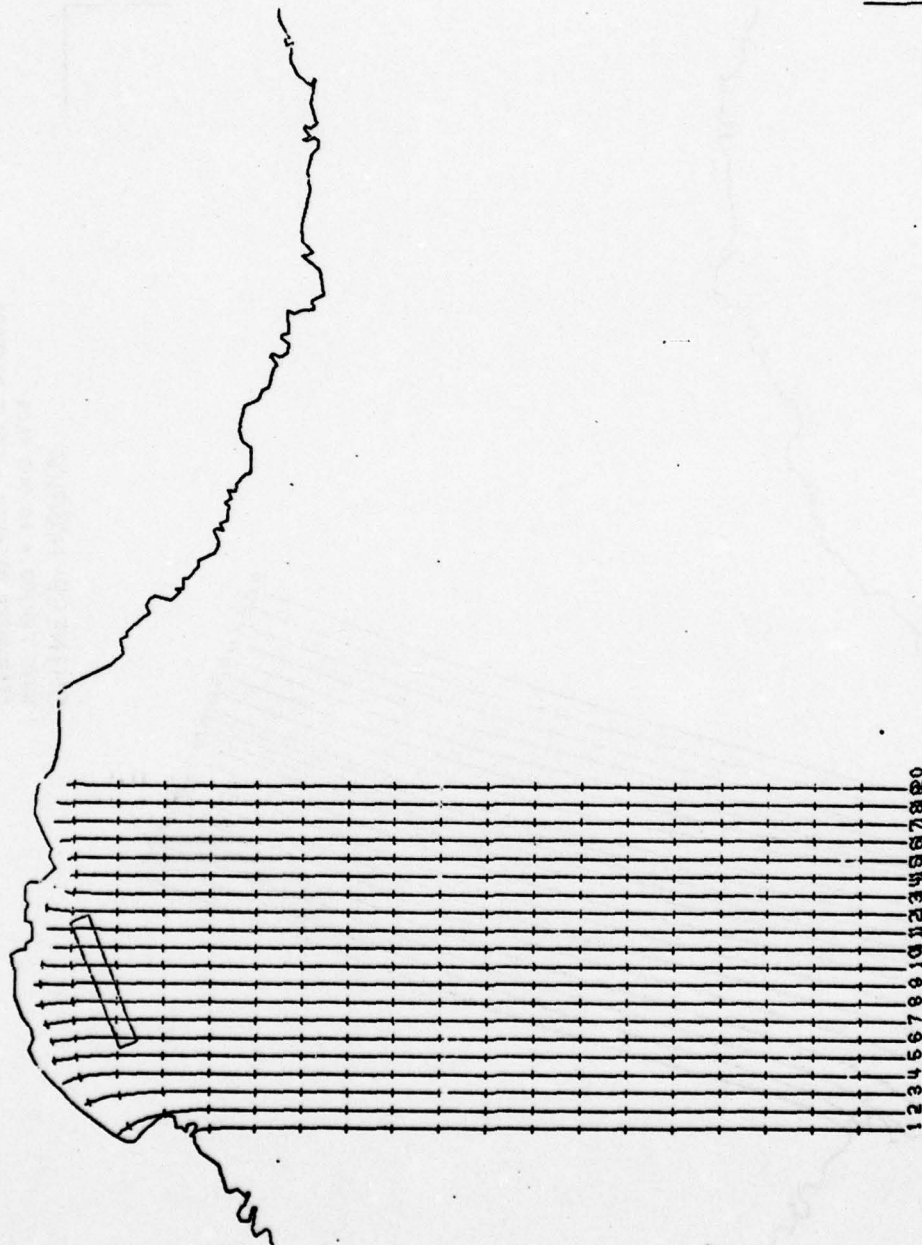


CHINESE HARBOR  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 337.5 DEGREES

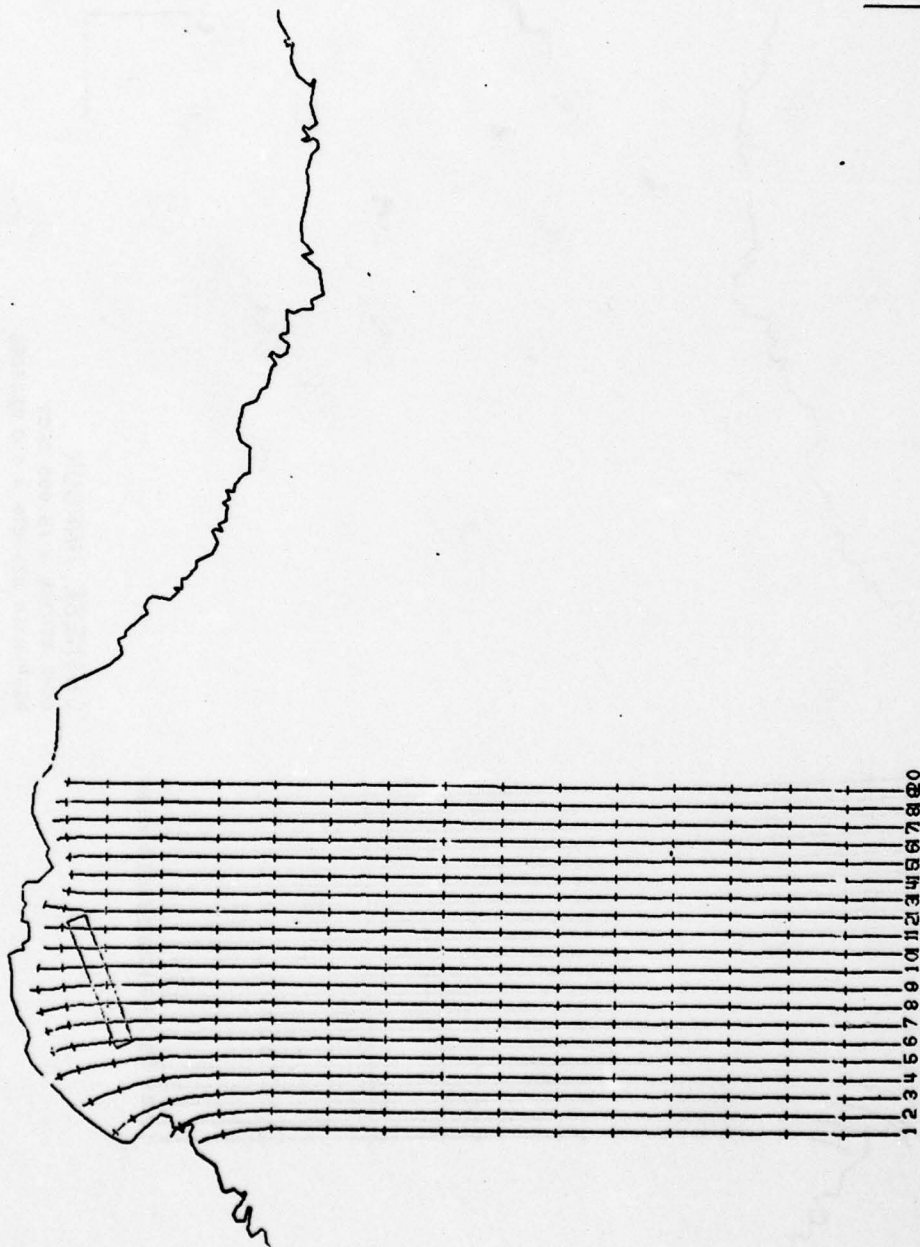


CHINESE HARBOR  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 337.5 DEGREES

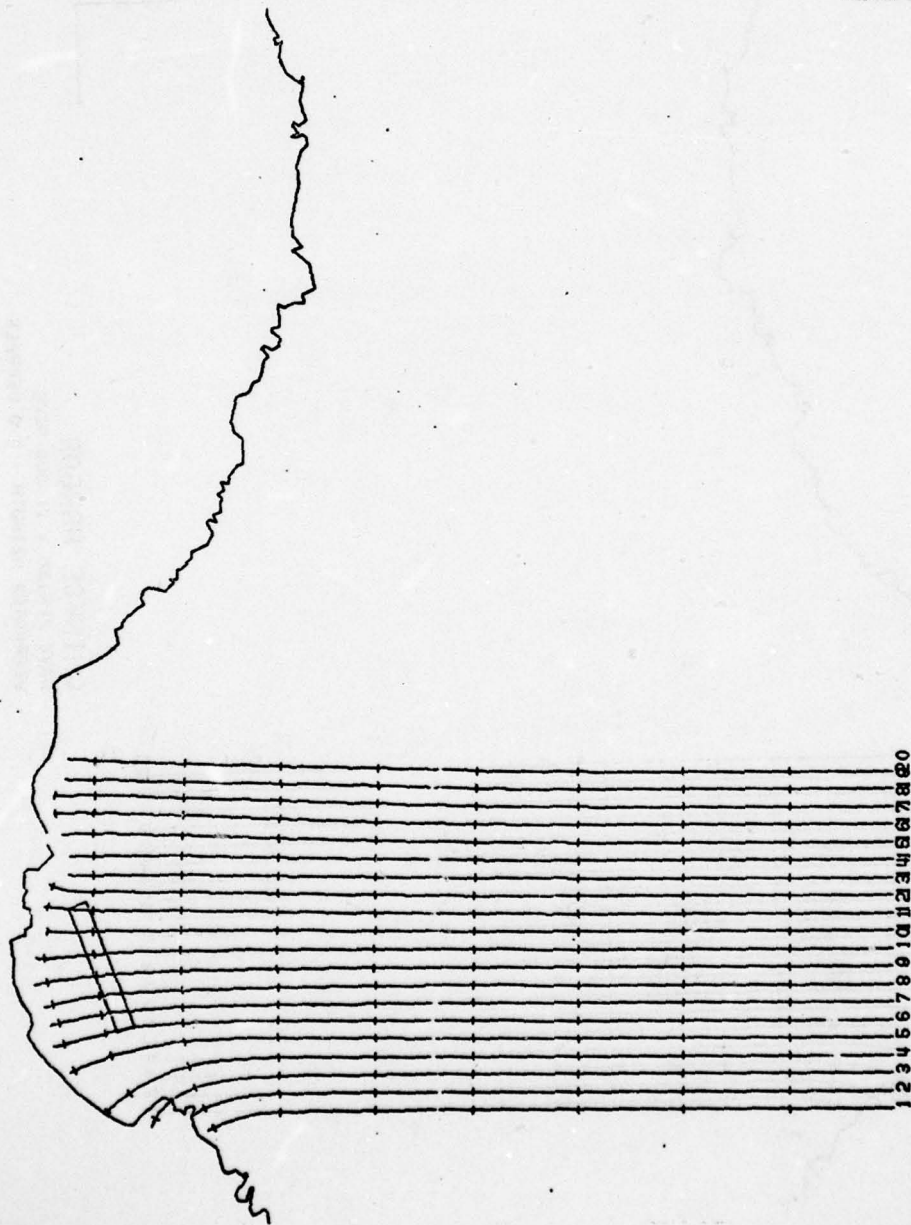




CHINESE HARBOR  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES

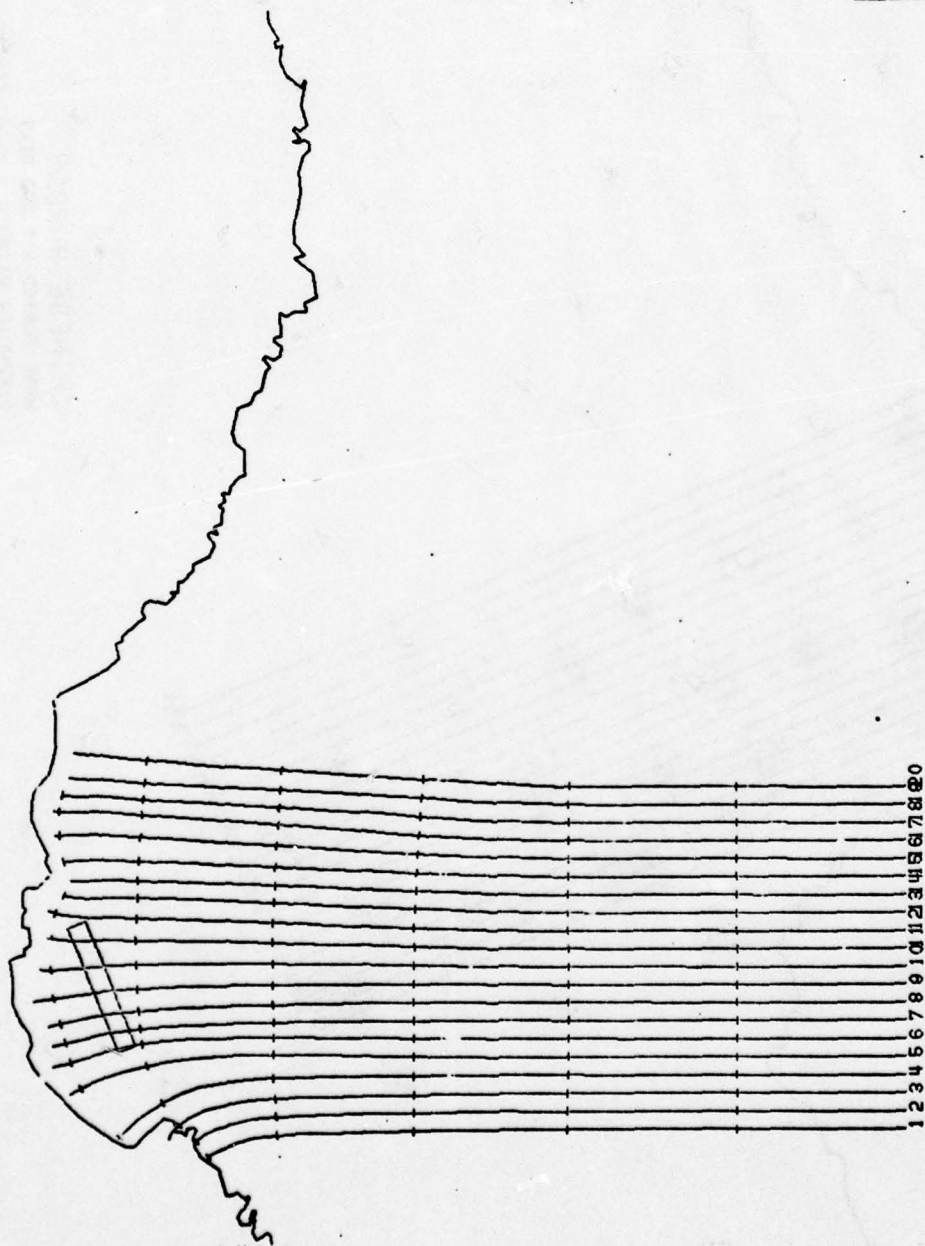


CHINESE HARBOR  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES

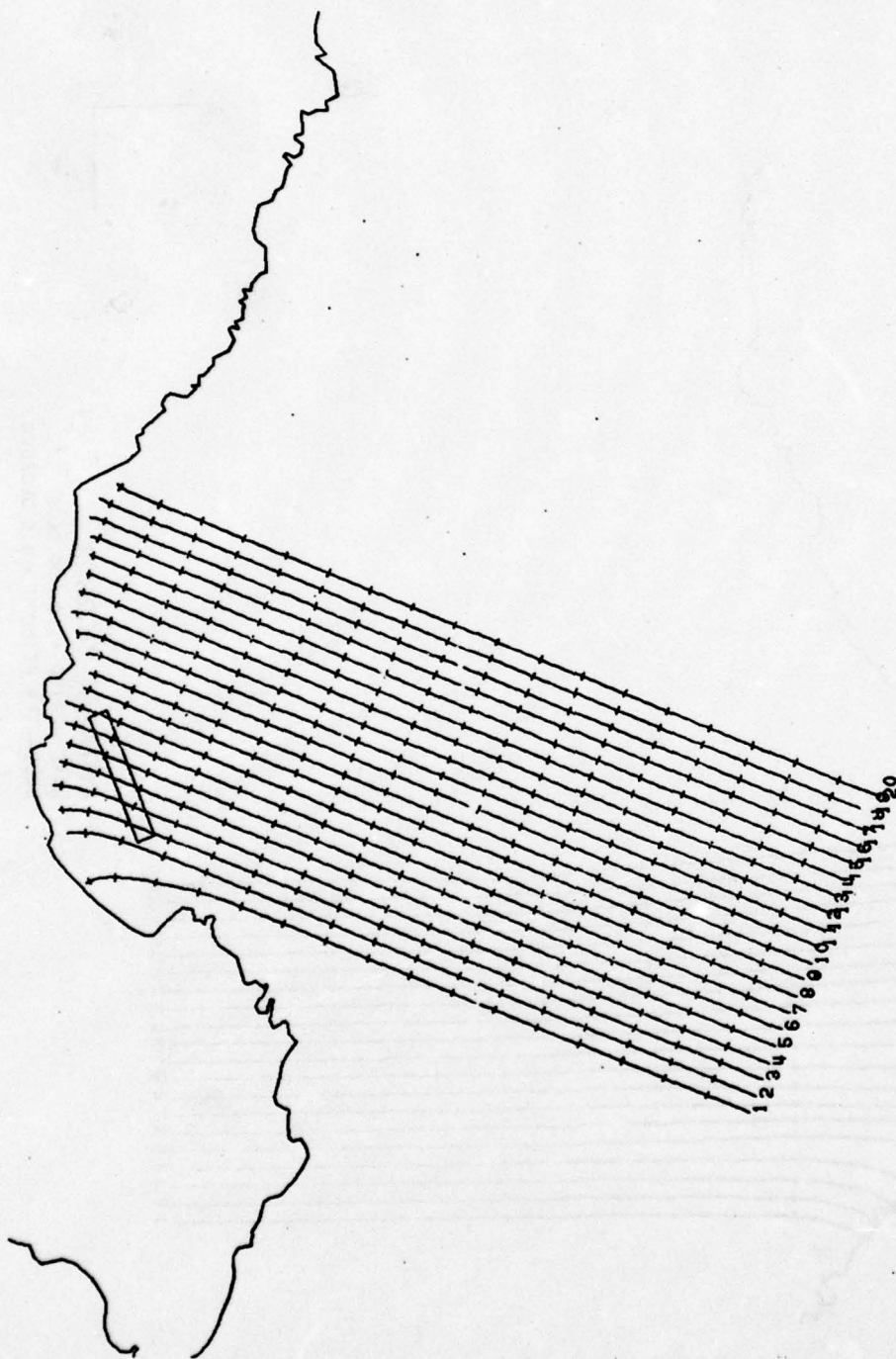


CHINESE HARBOR  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES

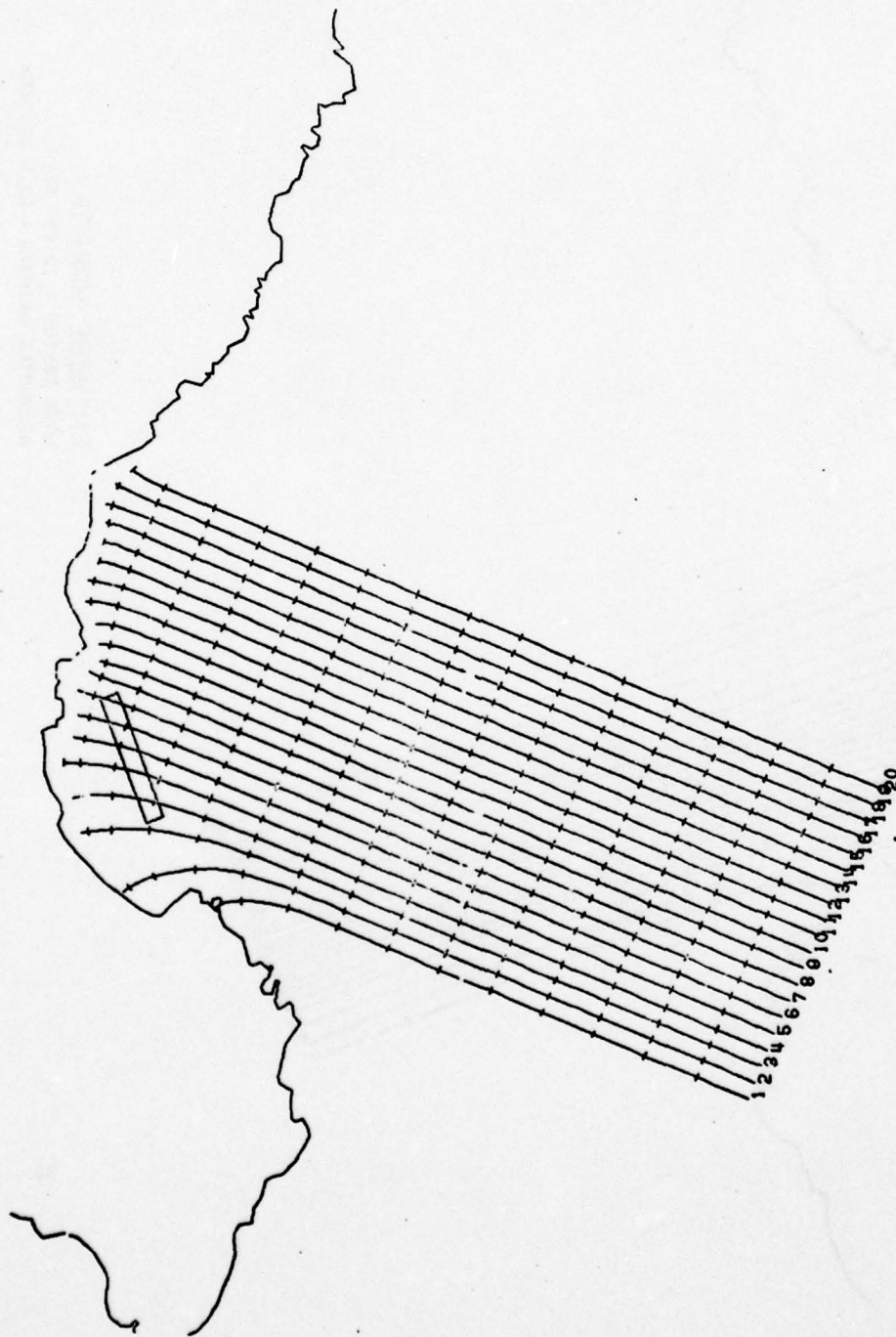




CHINESE HARBOR  
WAVE PERIOD = 10.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES

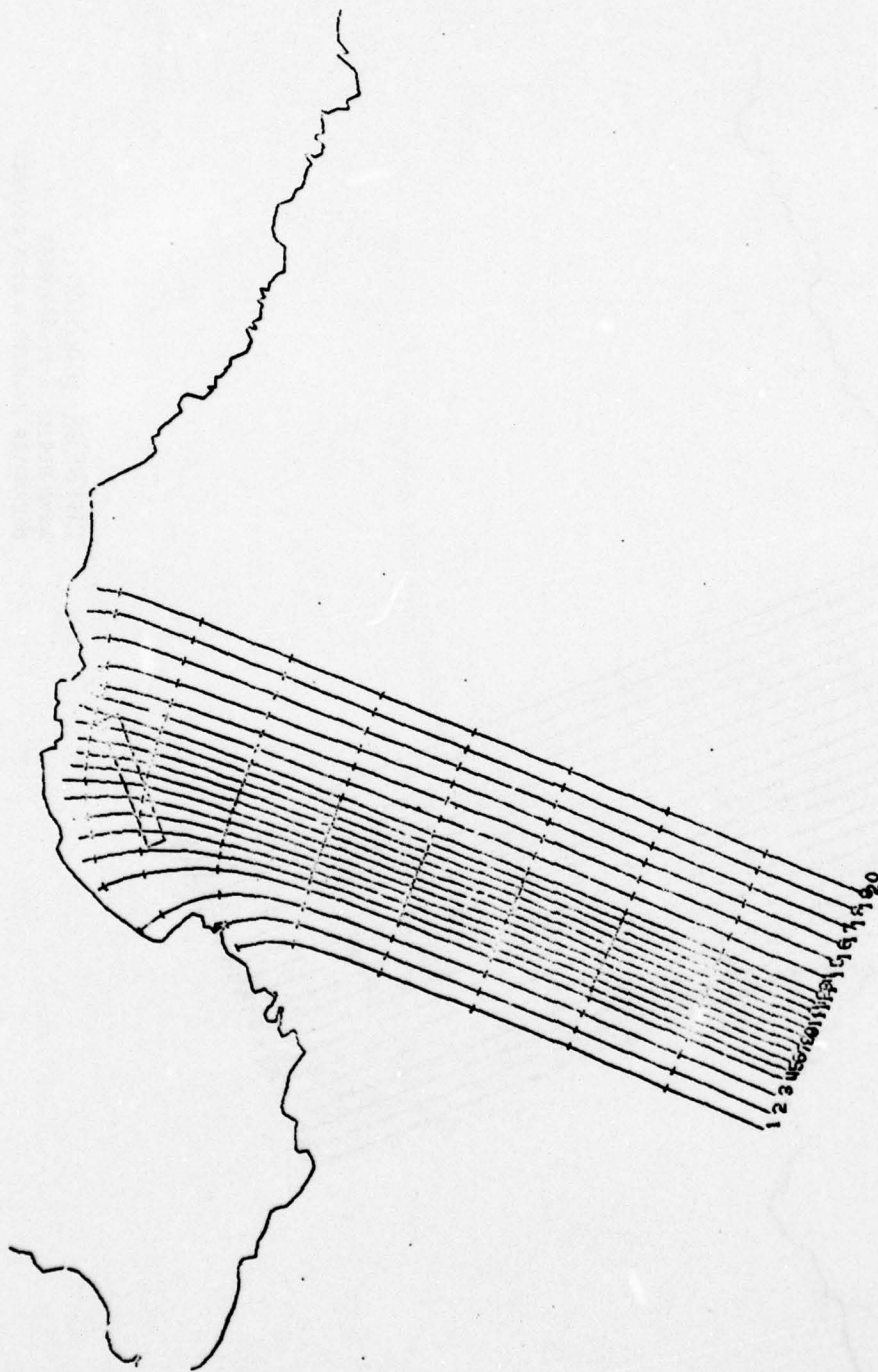


CHINESE HARBOR  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES

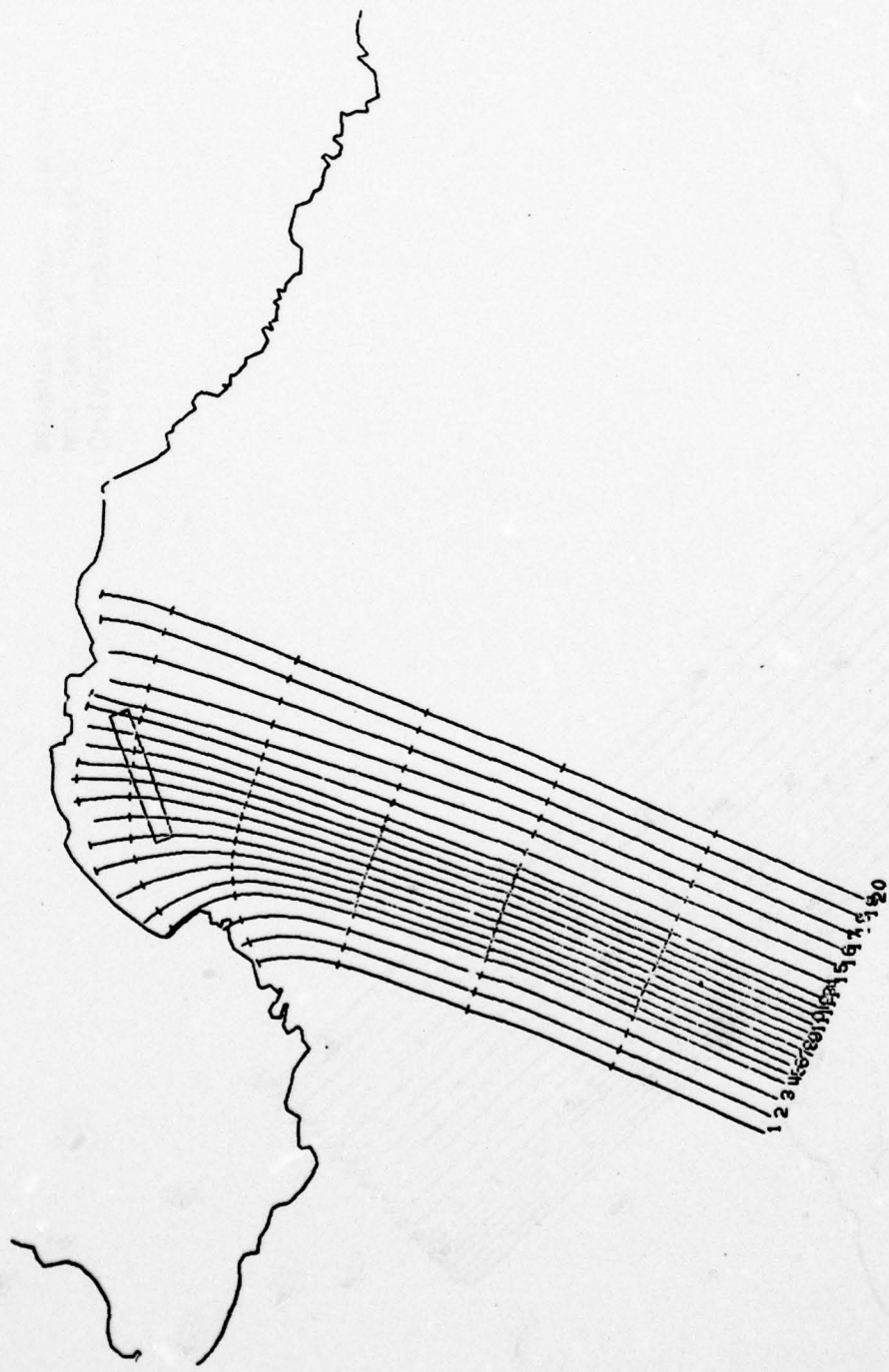


CHINESE HARBOR  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES





CHINESE HARBOR  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES



CHINESE HARBOR  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES



CHINESE HARBOR  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES





CHINESE HARBOR  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 05.0 DEGREES

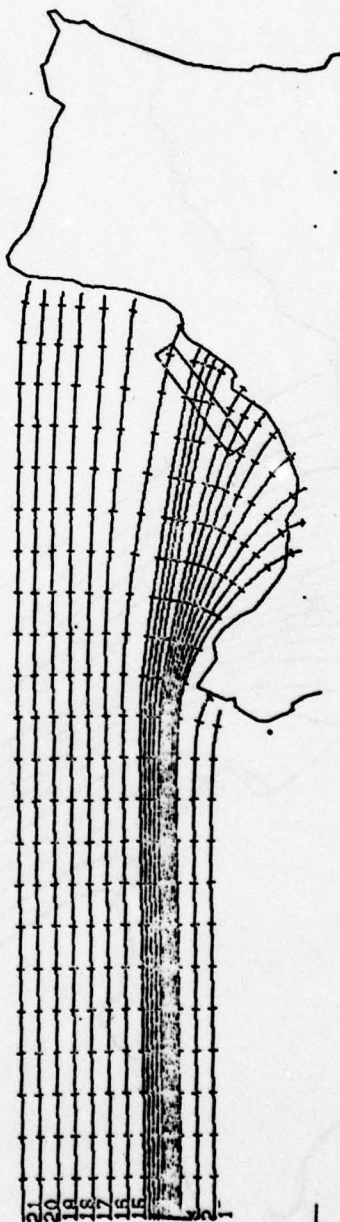


CHINESE HARBOUR  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

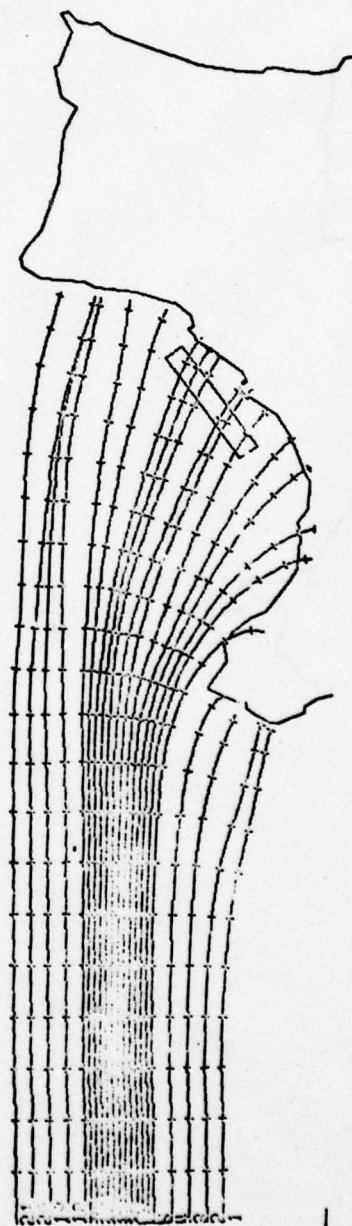


CHINESE HARBOR  
WAVE PERIOD = 19.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

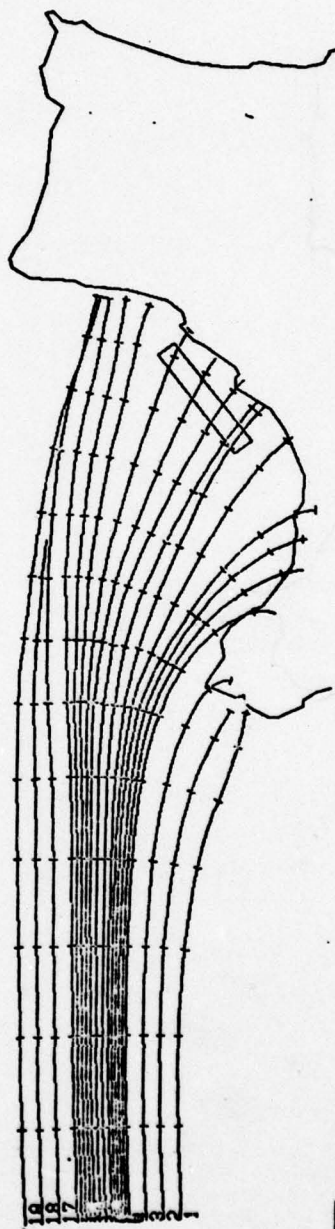




BEACHERS BAY  
 WAVE PERIOD = 7.000 SECS  
 REF. WATER AZIMUTH = 337.5 DEGREES

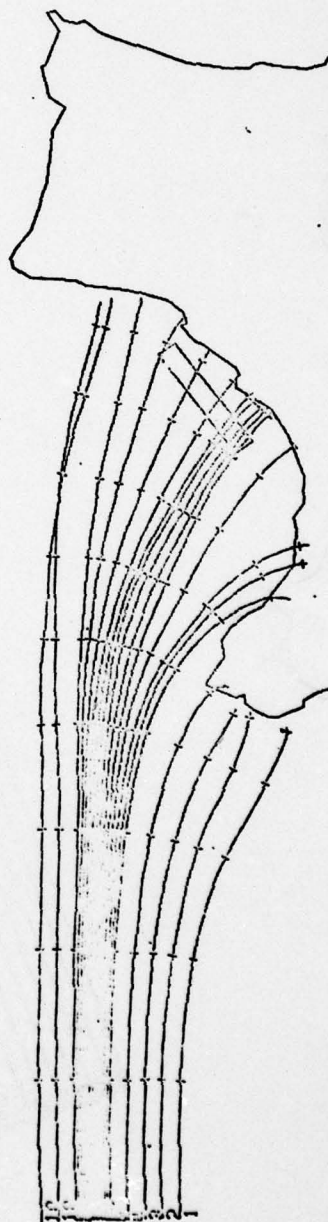


BEACHERS BAY  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 307 DEGREES

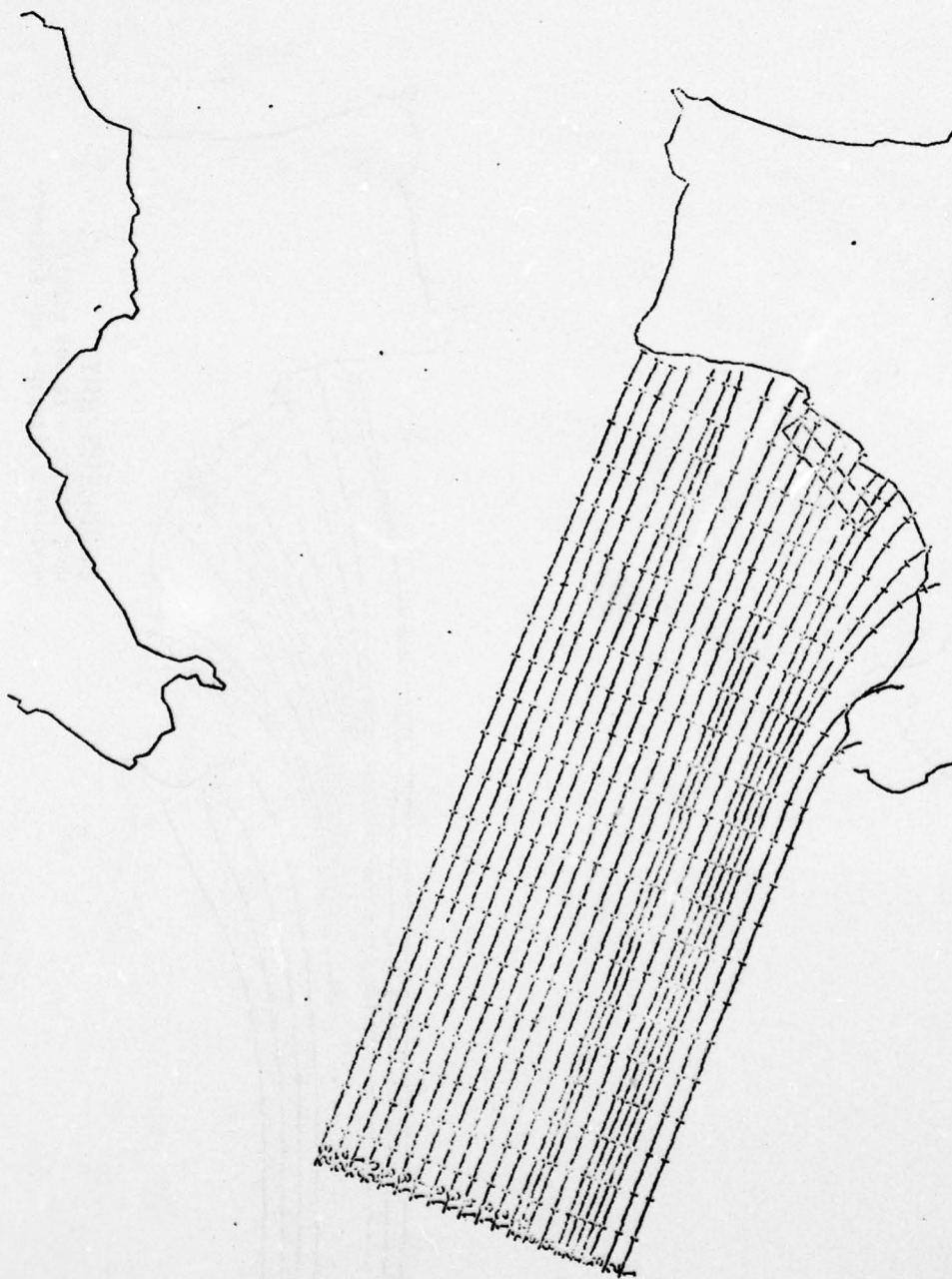


BEACHERS BAY  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 000° E. DEGREES

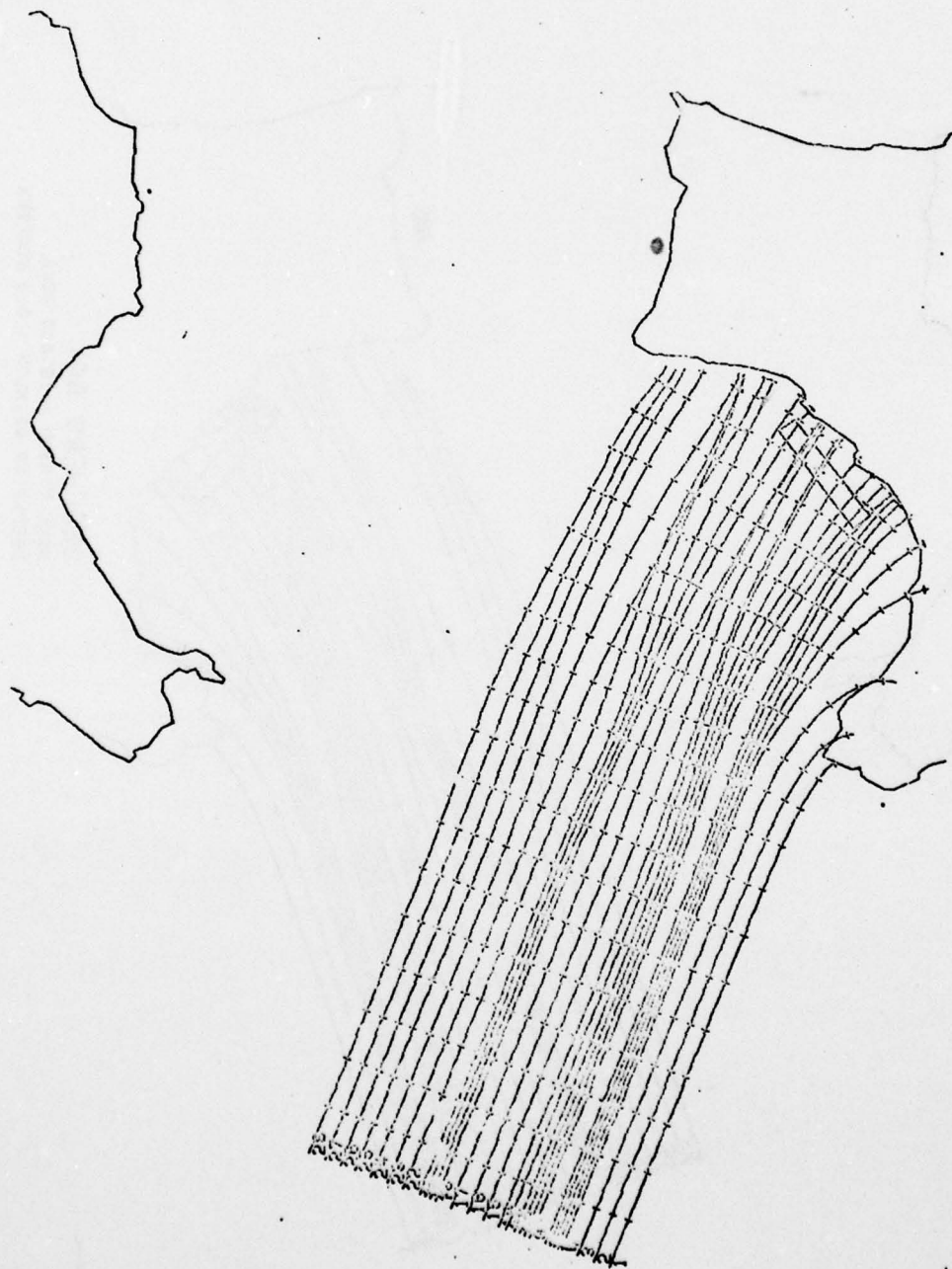




BEACHERS BAY  
WAVE PERIOD = 19.000 SECS  
DEEPEST ANGLE = 337.5 DEGREES

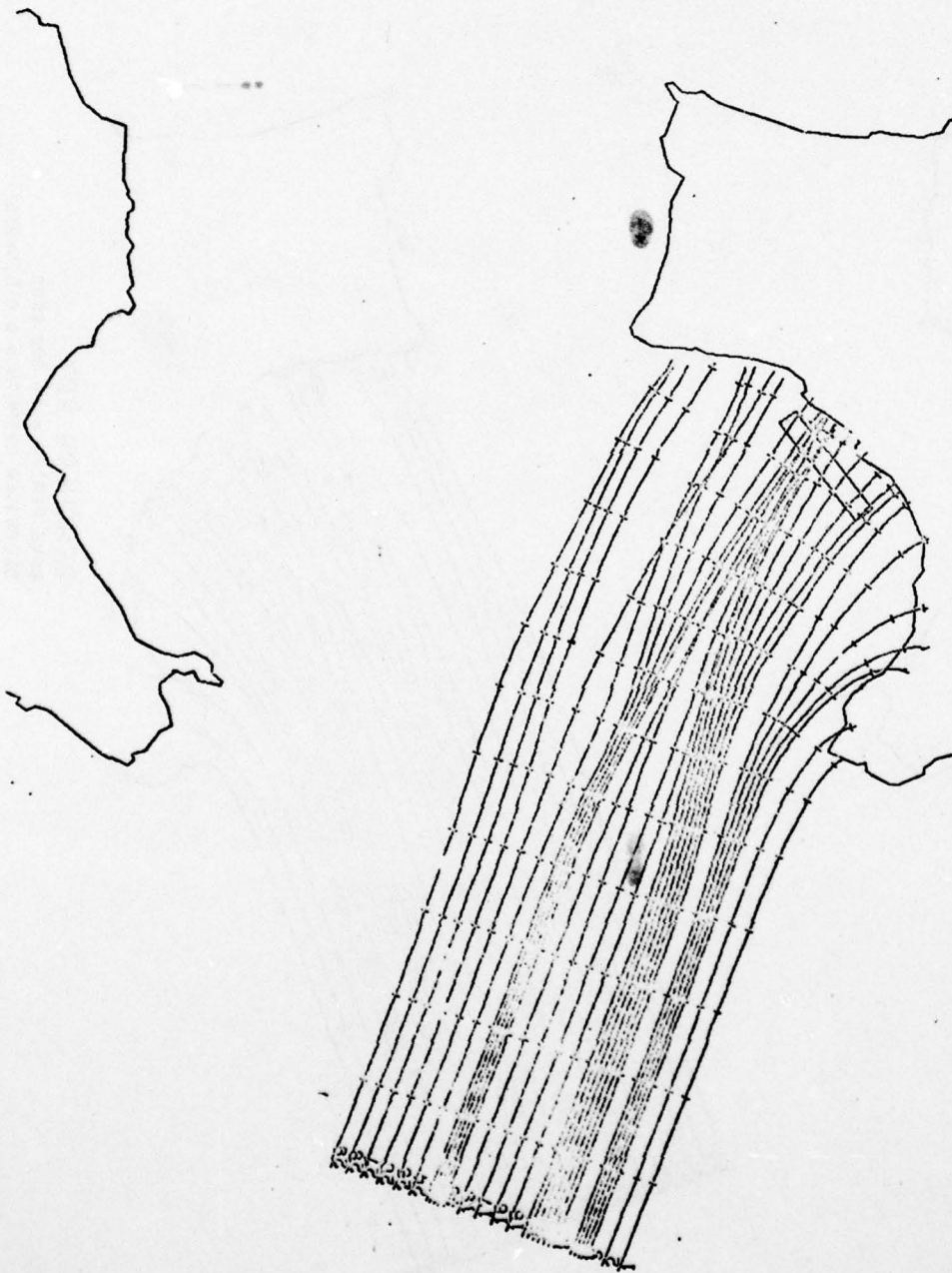


BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES



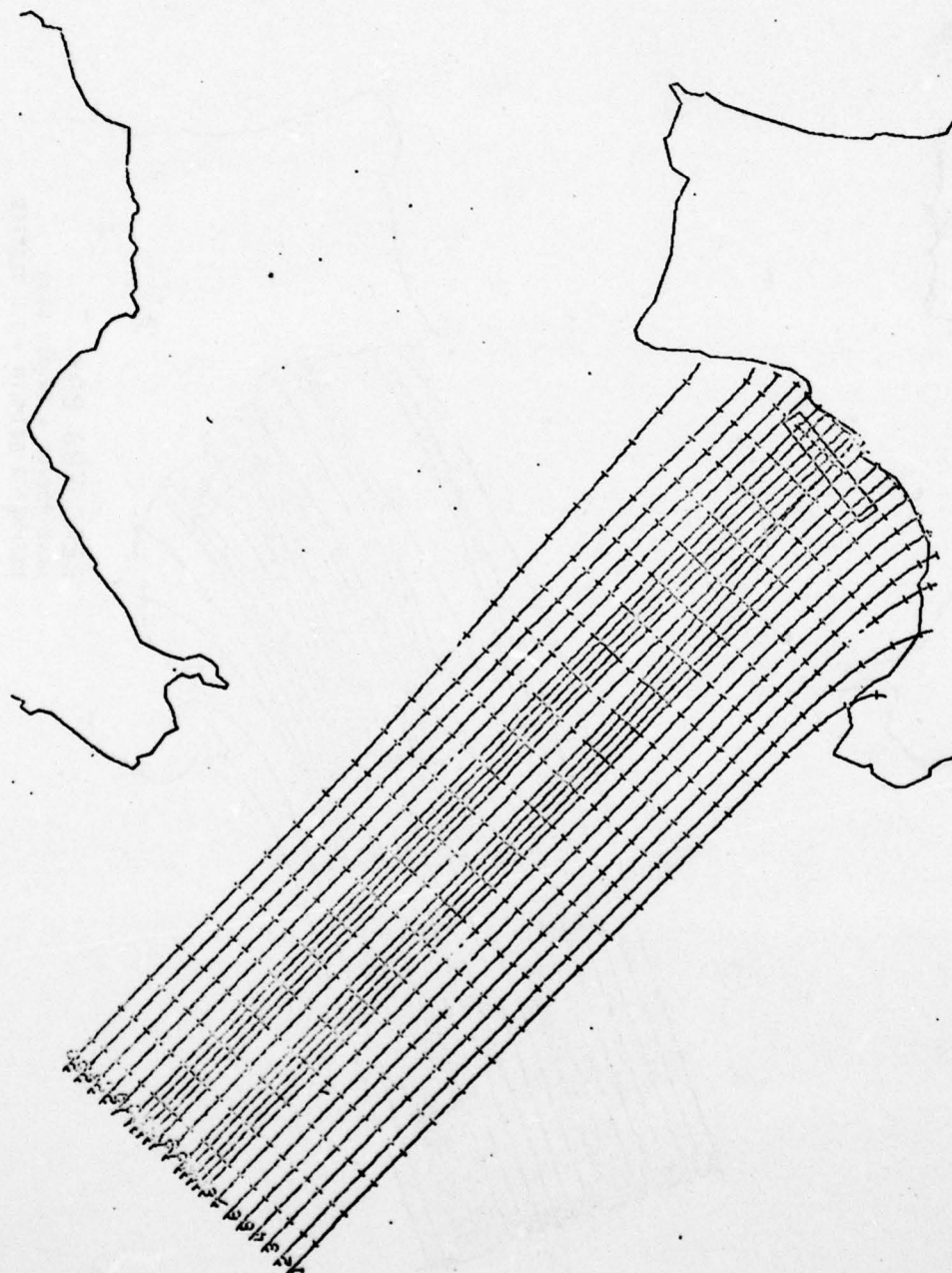
BEACHERS BAY  
WAVE PERIOD = 11.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES





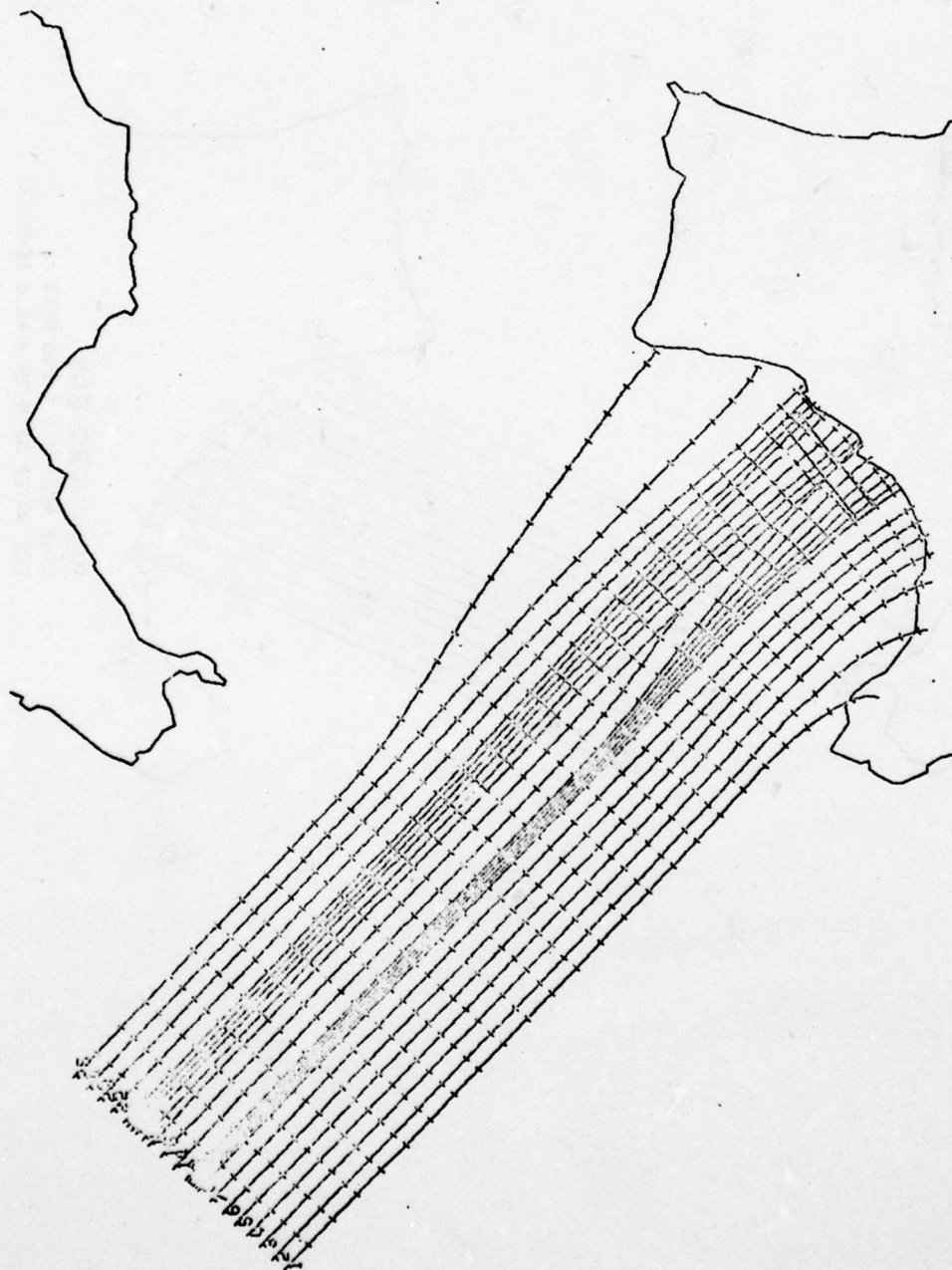
BEACHERS BAY  
WAVE PERIOD = 15.000 SECS  
DEEPWATER AZIMUTH = 0.0 DEGREES



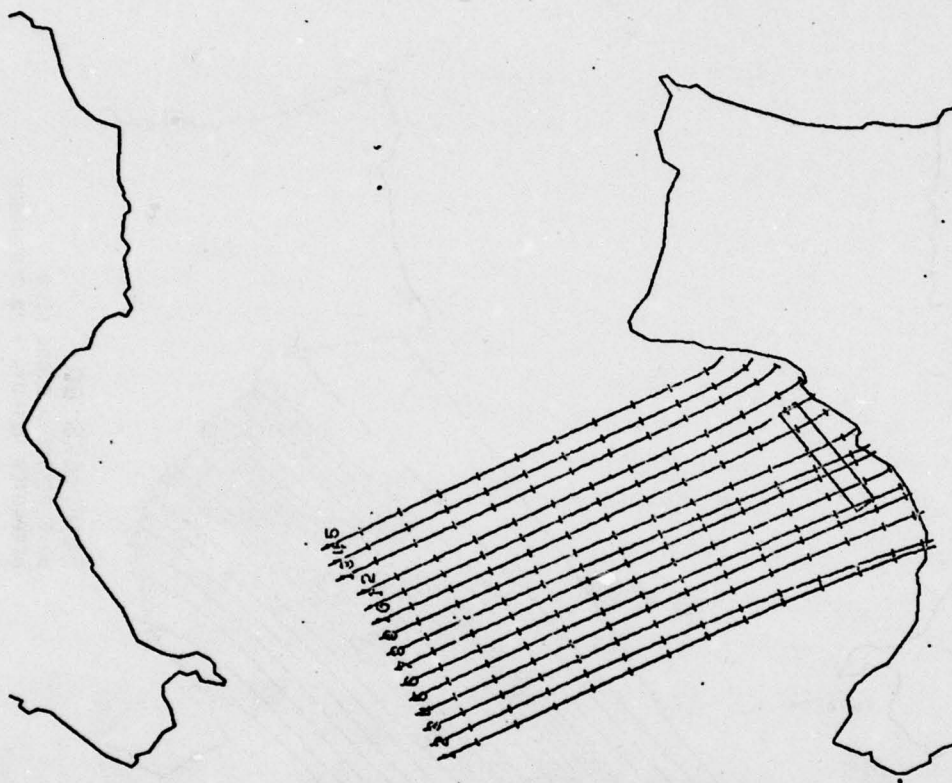


BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES





BEACHERS BAY  
WAVE PERIOD = 8.000 SECS  
DEEPWATER AZIMUTH = 22.5 DEGREES



BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

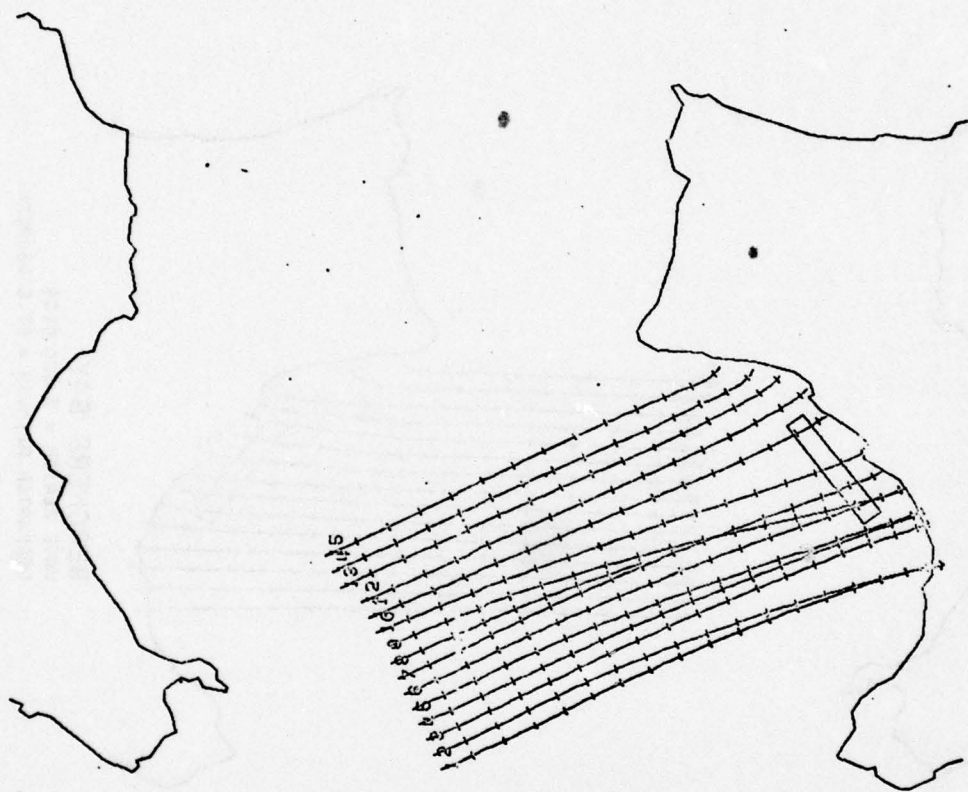


BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

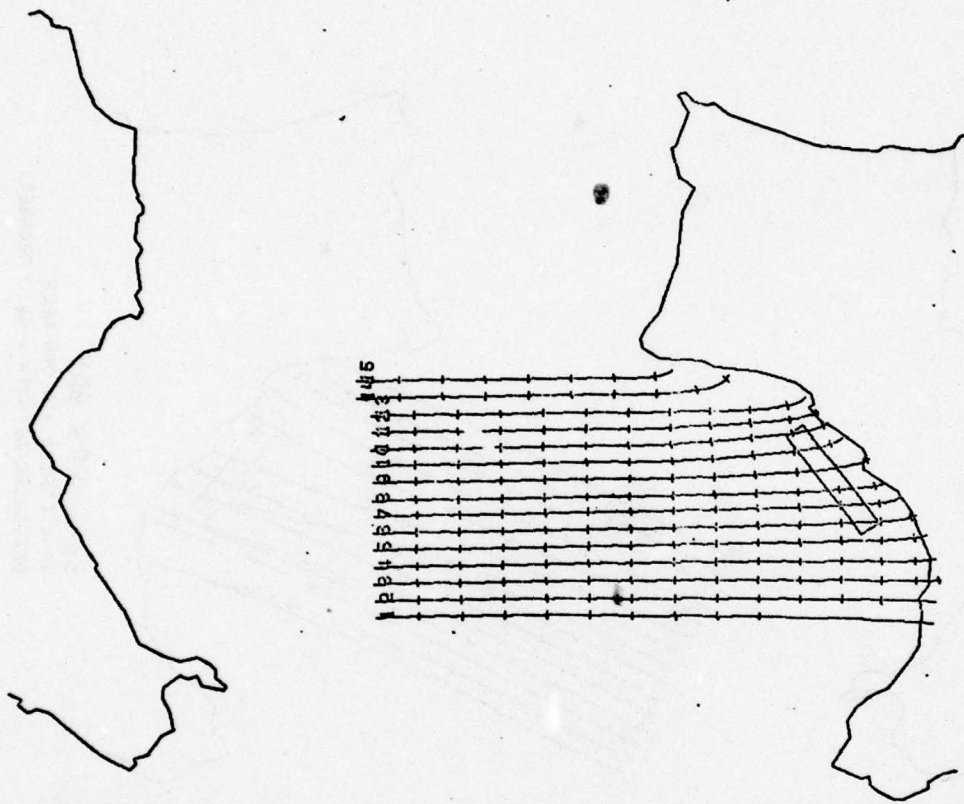




BEACHERS BAY  
WAVE PERIOD = 9.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

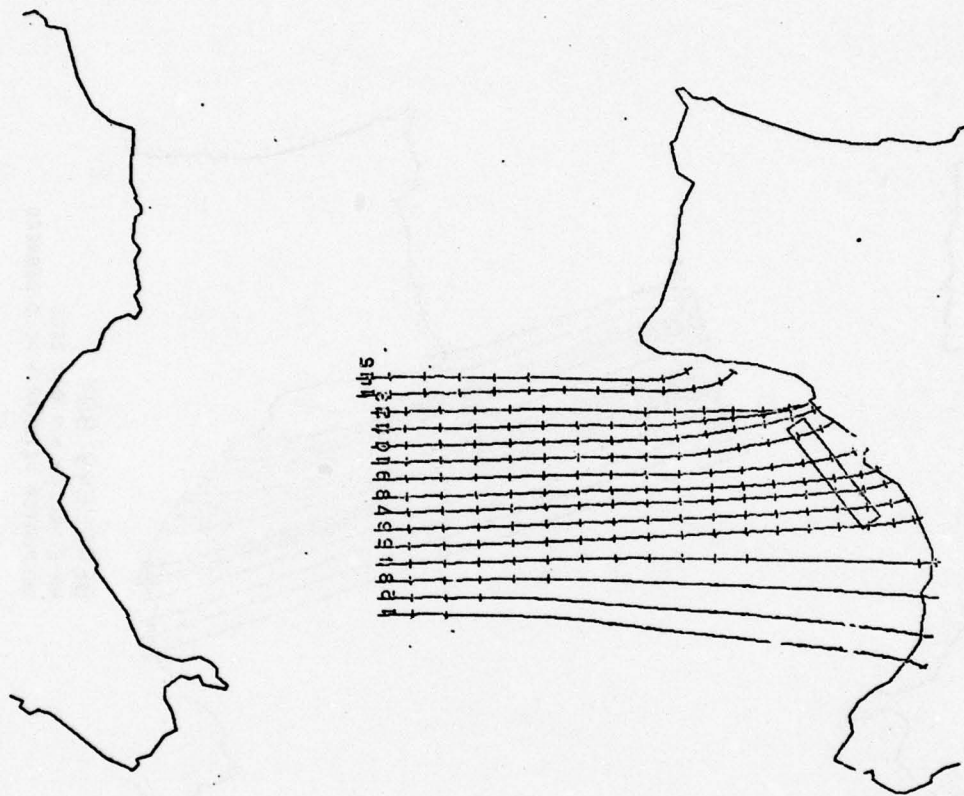


BEACHERS BAY  
WAVE PERIOD = 9.000 SECS  
DEEPWATER AZIMUTH = 45.0 DEGREES

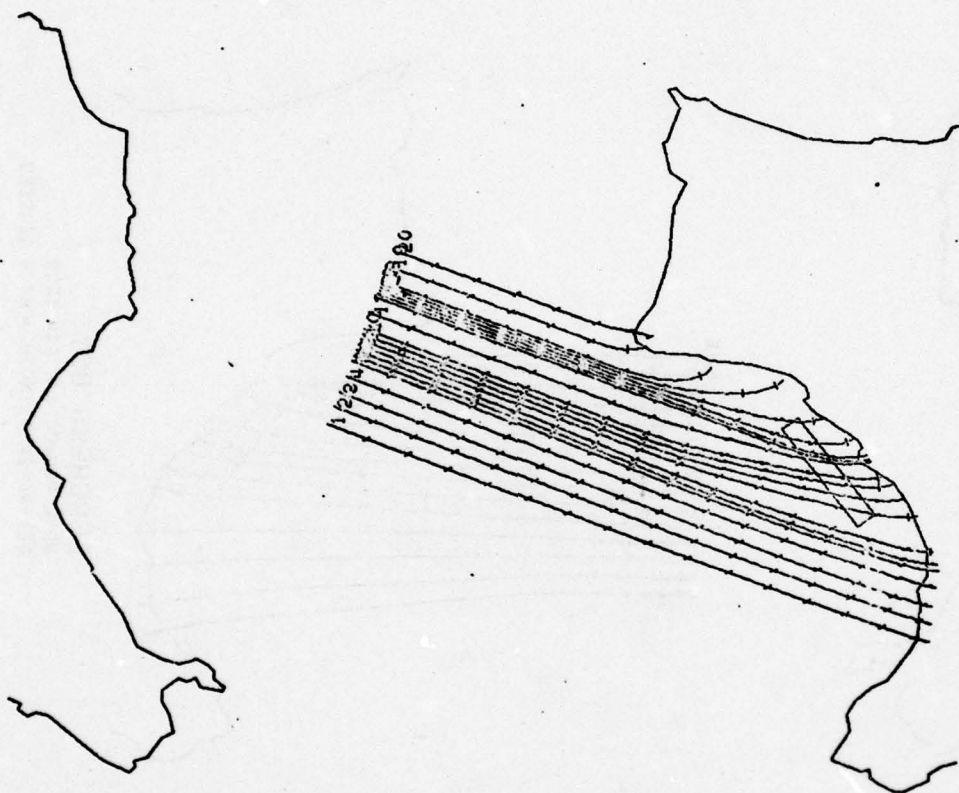


BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 67.5 DEGREES

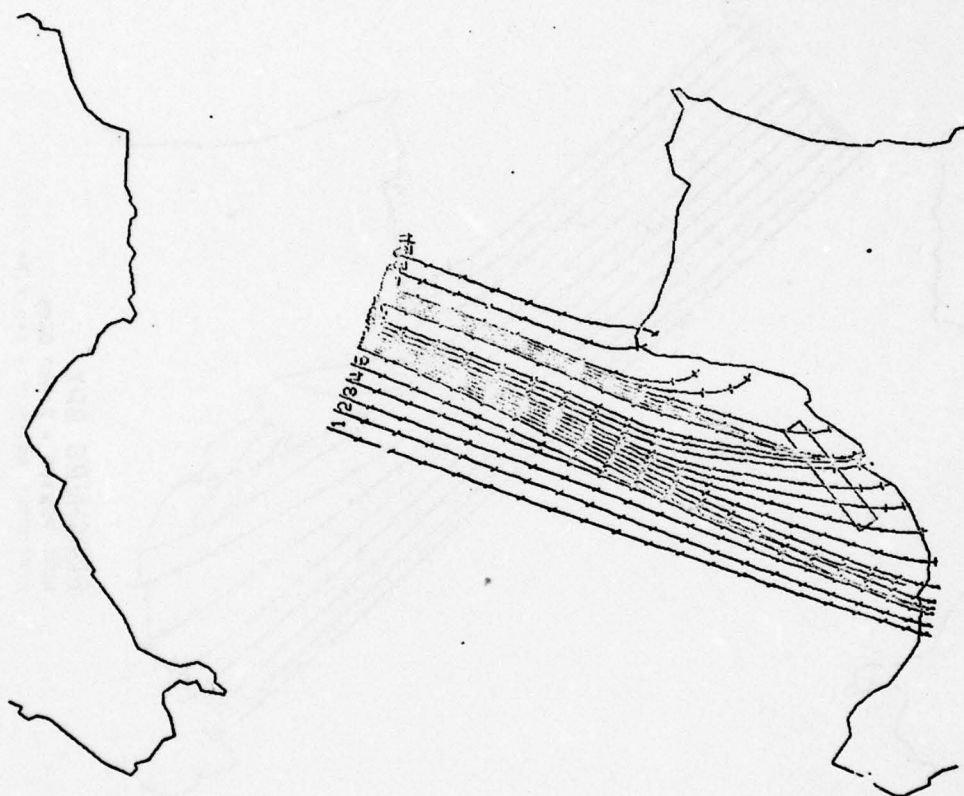




BEACHERS BAY  
WAVE PERIOD = 9.000 SECS  
DEEPWATER AZIMUTH = 67.5 DEGREES



BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 90.0 DEGREES



BEACHERS BAY  
WAVE PERIOD = 0.000 SECS  
DEEPWATER AZIMUTH = 90.0



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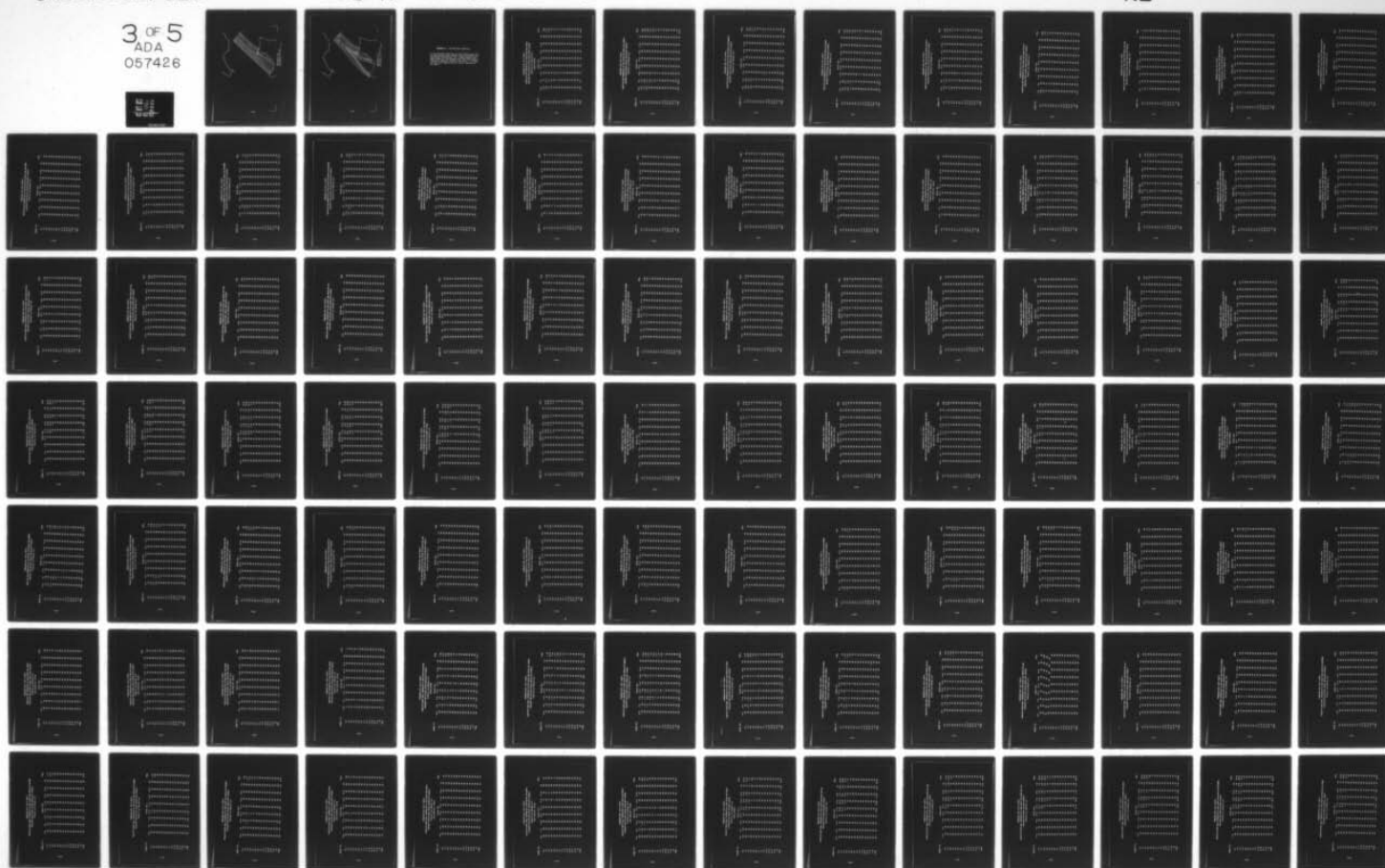
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 13/10  
PRELIMINARY EVALUATION OF WIND AND WAVE EFFECTS AT POTENTIAL LN--ETC(U).  
JUL 78 L Z HALES

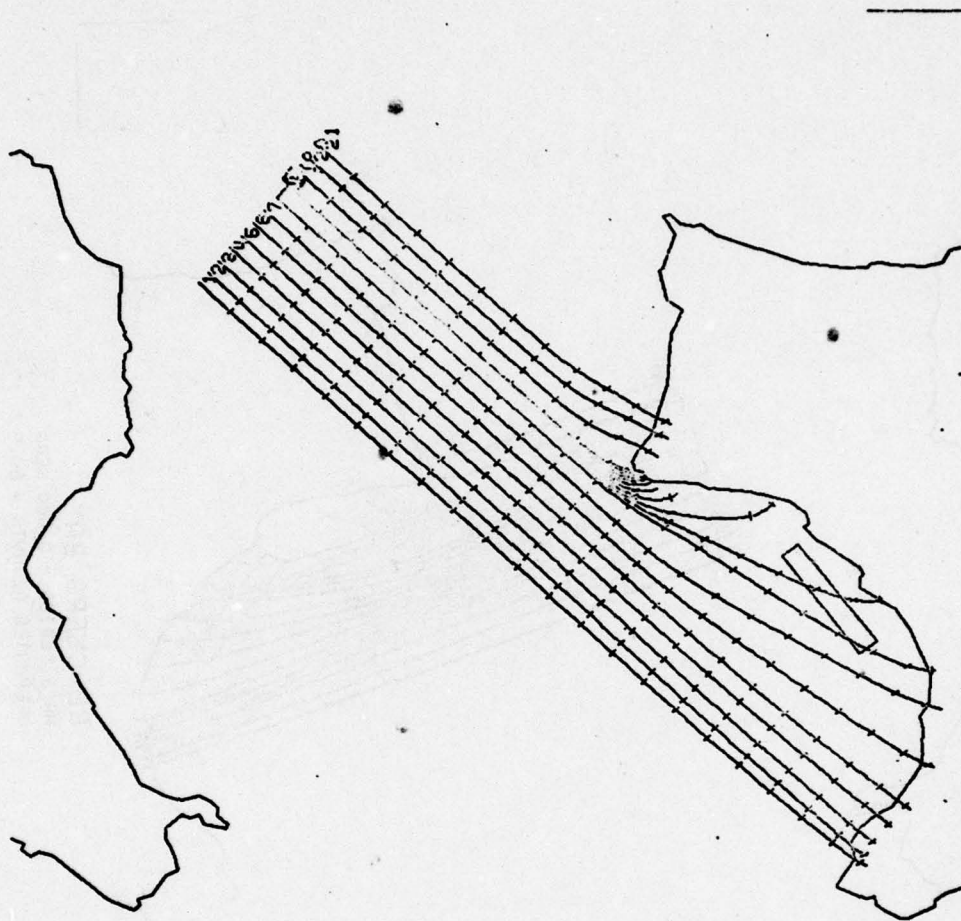
UNCLASSIFIED

WES-MP-H-78-2-APP-B

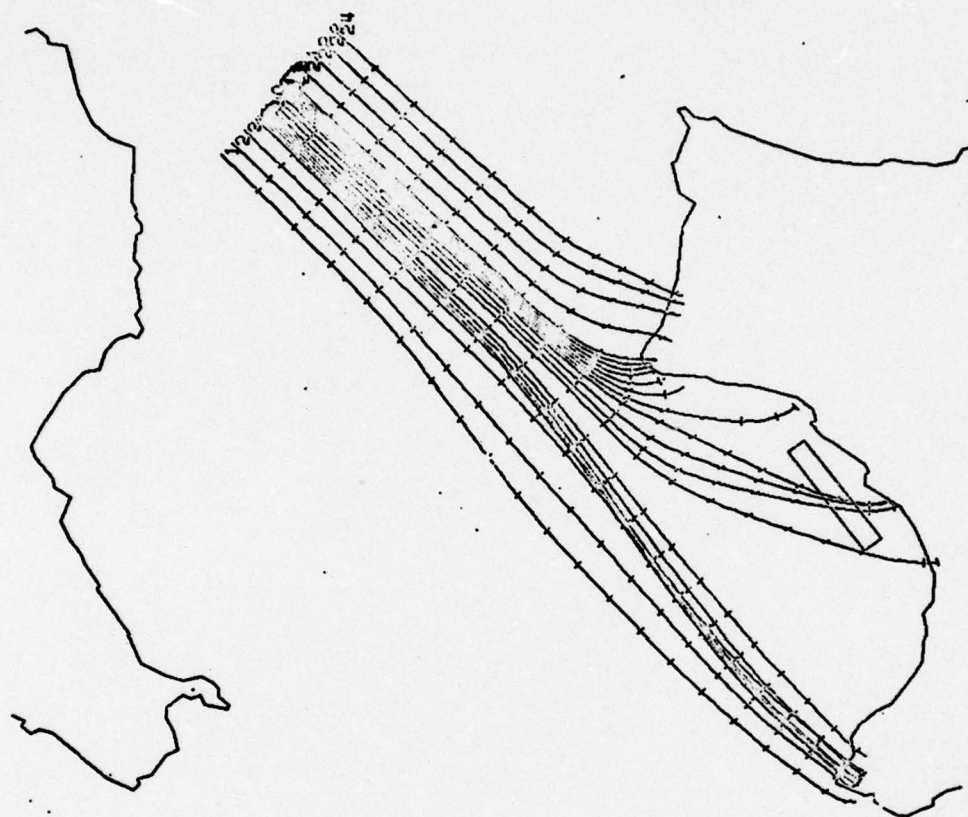
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BEACHERS BAY  
WAVE PERIOD = 7.000 SECS  
DEEPWATER AZIMUTH = 110 E BEACHERS



BEACHERS BAY  
WAVE PERIOD = 11.000 SECS  
REFRACTED DIRECTION = 110 E DEGREES



## **ADDENDUM II: LNG SITE WAVE STATISTICS**

In the following tables the sea and northern swell data for Camp Pendleton LNG terminal site were deduced from Meteorology International, Inc.'s DNOD singular wave model statistics, and southern swell data were deduced from Marine Adviser's Station A statistics. All other site data were deduced from the sources indicated on the tables.

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.43	.57	.00	.00	.00	.00	.00	.00
1-2	1.05	2.16	.02	.00	.00	.00	.00	.00
2-3	1.27	1.21	.05	.00	.00	.00	.00	.00
3-4	.30	.62	.00	.00	.00	.00	.00	.00
4-5	.00	.30	.01	.00	.00	.00	.00	.00
5-6	.00	.21	.03	.00	.00	.00	.00	.00
6-7	.00	.04	.10	.00	.00	.00	.00	.00
7-9	.00	.00	.18	.00	.00	.00	.00	.00
9-11	.00	.00	.07	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.05	5.11	.47	.00	.00	.00	.00	10.62

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	4.20	1.36	.00	.00	.00	.00	.00	5.56
1-2	1.74	2.86	.00	.00	.00	.00	.00	4.60
2-3	2.83	2.14	.00	.00	.00	.00	.00	4.96
3-4	.83	1.42	.00	.00	.00	.00	.00	2.25
4-5	.00	1.47	.14	.00	.00	.00	.00	1.62
5-6	.00	.95	.36	.00	.00	.00	.00	1.31
6-7	.00	.11	.16	.00	.00	.00	.00	.26
7-9	.00	.00	.14	.00	.00	.00	.00	.14
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	9.60	10.30	.80	.00	.00	.00	.00	20.70



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	3.06	2.84	.00	.00	.00	.00	.00	.00
1-2	2.42	3.46	.00	.00	.00	.00	.00	.00
2-3	2.64	1.76	.30	.00	.00	.00	.00	.00
3-4	.27	1.16	.00	.00	.00	.00	.00	.00
4-5	.00	.60	.00	.00	.00	.00	.00	.00
5-6	.00	.79	.00	.00	.00	.00	.00	.00
6-7	.00	.23	.60	.00	.00	.00	.00	.00
7-9	.00	.06	1.56	.00	.00	.00	.00	.00
9-11	.00	.00	.79	.00	.00	.00	.00	.00
11-13	.00	.00	.05	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	8.40	10.90	3.30	.00	.00	.00	.00	22.60

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	4.61	1.00	.00	.00	.00	.00	.00	.00
1-2	1.97	3.27	.00	.00	.00	.00	.00	.00
2-3	2.25	1.50	.00	.00	.00	.00	.00	.00
3-4	.27	1.74	.00	.00	.00	.00	.00	.00
4-5	.00	.65	.00	.00	.00	.00	.00	.00
5-6	.00	.33	.00	.00	.00	.00	.00	.00
6-7	.00	.10	.16	.00	.00	.00	.00	.00
7-9	.00	.00	.14	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	9.10	8.60	.30	.00	.00	.00	.00	.00

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	1.98	1.01	.00	.00	.00	.00	.00	.00
1-2	.57	1.79	.00	.00	.00	.00	.00	.00
2-3	1.15	.20	.30	.00	.00	.00	.00	.00
3-4	1.00	.74	.00	.00	.00	.00	.00	.00
4-5	.00	.21	.00	.00	.00	.00	.00	.00
5-6	.00	.45	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.14	.00	.00	.00	.00	.00
7-9	.00	.00	.16	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	4.70	4.40	.60	.00	.00	.00	.00	9.70



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.82	.00	.00	.00	.00	.00	.00	2.82
1-2	1.06	.00	.30	.00	.00	.00	.00	1.36
2-3	.67	.47	.00	.00	.00	.00	.00	1.14
3-4	.54	.36	.00	.00	.00	.00	.00	.90
4-5	.00	.28	.00	.00	.00	.00	.00	.28
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.10	1.10	.30	.00	.00	.00	.00	6.50

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	1.11	.00	.00	.00	.00	.00	.00	.00
1-2	.52	.00	.00	.00	.00	.00	.00	.00
2-3	.37	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	2.00	.00	.00	.00	.00	.00	.00	2.00

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.50	.30	.00	.00	.00	.00	.00	2.80
1-2	.02	.00	.00	.00	.00	.00	.00	.02
2-3	.61	.00	.00	.00	.00	.00	.00	.61
3-4	.27	.00	.00	.00	.00	.00	.00	.27
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	3.40	.30	.00	.00	.00	.00	.00	3.70



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	2.67	.30	.00	.00	.00	.00	.00	.00	2.97
1-2	.46	.00	.00	.00	.00	.00	.00	.00	.46
2-3	.37	.00	.00	.00	.00	.00	.00	.00	.37
3-4	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	3.50	.30	.00	.00	.00	.00	.00	.00	3.80

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.90	.00	.00	.00	.00	.00	.00	.90
1-2	.02	.00	.00	.00	.00	.00	.00	.02
2-3	.20	.00	.00	.00	.00	.00	.00	.20
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.20	.00	.00	.00	.00	.00	.00	1.20

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	2.13	.00	.00	.00	.00	.00	.00	.00	2.13
1-2	1.21	.36	.00	.00	.00	.00	.00	.00	1.57
2-3	1.81	.74	.00	.00	.00	.00	.00	.00	2.55
3-4	.45	.00	.00	.00	.00	.00	.00	.00	.45
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.60	1.10	.00	.00	.00	.00	.00	.00	6.70



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.91	.00	.00	.00	.00	.00	.00	.00	.91
1-2	.73	3.46	.00	.00	.00	.00	.00	.00	4.19
2-3	.46	3.69	.00	.00	.00	.00	.00	.00	4.15
3-4	.00	1.22	.00	.00	.00	.00	.00	.00	1.22
4-5	.00	.24	.00	.00	.00	.00	.00	.00	.24
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	2.10	8.60	.00	.00	.00	.00	.00	.00	10.70

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	PERIOD (SEC)				16-18	>18	TOTAL
				10-12	12-14	14-16				
0-1	2.24	.00	.00	.00	.00	.00	.00	.00	.00	2.24
1-2	1.92	10.66	.00	.00	.00	.00	.00	.00	.00	12.59
2-3	1.74	4.00	.00	.00	.00	.00	.00	.00	.00	5.74
3-4	.00	.87	.00	.00	.00	.00	.00	.00	.00	.87
4-5	.00	.17	.00	.00	.00	.00	.00	.00	.00	.17
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.14	.00	.00	.00	.00	.00	.00	.14
7-9	.00	.00	.16	.00	.00	.00	.00	.00	.00	.16
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.90	15.70	.30	.00	.00	.00	.00	.00	.00	21.90

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 67.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	1.01	.41	.00	.00	.00	.00	.00	.00
1-2	.20	1.59	.02	.00	.00	.00	.00	.00
2-3	.17	1.02	.00	.00	.00	.00	.00	.00
3-4	.02	.16	.00	.00	.00	.00	.00	.00
4-5	.00	.02	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.40	3.20	.02	.00	.00	.00	.00	4.62



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 135.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.17	.00	.00	.00	.00	.00	.00	.17
2-3	.25	.02	.00	.00	.00	.00	.00	.27
3-4	.07	.11	.00	.00	.00	.00	.00	.18
4-5	.00	.12	.00	.00	.00	.00	.00	.12
5-6	.00	.07	.00	.00	.00	.00	.00	.07
6-7	.00	.02	.04	.00	.00	.00	.00	.06
7-9	.00	.00	.07	.00	.00	.00	.00	.07
9-11	.00	.00	.04	.00	.00	.00	.00	.04
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.49	.33	.15	.00	.00	.00	.00	.97

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 157.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.09	.00	.00	.00	.00	.00	.00	.09
2-3	.19	.01	.00	.00	.00	.00	.00	.20
3-4	.06	.09	.00	.00	.00	.00	.00	.15
4-5	.00	.06	.00	.00	.00	.00	.00	.06
5-6	.00	.03	.00	.00	.00	.00	.00	.03
6-7	.00	.00	.06	.00	.00	.00	.00	.06
7-9	.00	.00	.11	.00	.00	.00	.00	.11
9-11	.00	.00	.03	.00	.00	.00	.00	.03
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.34	.19	.20	.00	.00	.00	.00	.73

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.01	.05	.00	.00	.00	.00	.00	.06
1-2	.40	.36	.00	.00	.00	.00	.00	.76
2-3	.58	.15	.05	.00	.00	.00	.00	.78
3-4	.13	.26	.00	.00	.00	.00	.00	.39
4-5	.00	.11	.01	.00	.00	.00	.00	.12
5-6	.00	.11	.03	.00	.00	.00	.00	.14
6-7	.00	.02	.00	.00	.00	.00	.00	.02
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.12	1.07	.09	.00	.00	.00	.00	2.28



SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 202.50

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.93	.10	.00	.00	.00	.00	.00	.00	1.03
1-2	.20	.21	.00	.00	.00	.00	.00	.00	.40
2-3	.00	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.02	.00	.00	.00	.00	.00	.00	.00	.02
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.23	.31	.00	.00	.00	.00	.00	.00	1.54

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 225.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.47	.00	.00	.00	.00	.00	.00	.47
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.47	.00	.00	.00	.00	.00	.00	.47

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	1.57	3.95	.67	.02	.04	.00	6.26
1-2	.00	.56	1.51	1.41	.87	.35	.19	4.94
2-3	.00	.01	.18	.77	.34	.23	.03	1.61
3-4	.00	.00	.03	.58	.25	.13	.05	1.06
4-5	.00	.00	.01	.31	.23	.10	.01	.66
5-6	.00	.00	.00	.15	.16	.10	.02	.43
6-7	.00	.00	.00	.03	.03	.06	.02	.14
7-9	.00	.00	.00	.00	.10	.00	.00	.10
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.15	5.67	3.92	2.00	1.02	.32	15.19



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	3.63	5.60	.35	.00	.00	.00	.07
1-2	.00	1.37	3.30	2.71	1.93	1.33	.50	.53
2-3	.00	.00	.40	2.60	.97	.57	.00	.00
3-4	.00	.00	.00	1.40	.52	.30	.00	.00
4-5	.00	.00	.00	1.24	1.40	.07	.00	.00
5-6	.00	.00	.00	.10	.45	.28	.11	.00
6-7	.00	.00	.00	.20	.02	.25	.19	.00
7-9	.00	.00	.00	.00	.30	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	5.00	9.30	8.60	5.60	2.80	.80	32.70

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	2.19	5.40	.46	.00	.27	.00	8.31
1-2	.00	1.31	5.90	3.54	1.49	.93	1.01	14.19
2-3	.00	.00	1.00	2.69	1.31	1.19	.39	6.58
3-4	.00	.00	.00	2.17	1.05	.69	.00	3.91
4-5	.00	.00	.00	1.65	1.00	.35	.00	2.99
5-6	.00	.00	.00	1.49	1.00	.57	.00	3.05
6-7	.00	.00	.00	.20	.31	.50	.00	1.02
7-9	.00	.00	.00	.00	.84	.00	.00	.84
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	3.50	12.30	12.20	7.00	4.50	1.40	40.90

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	2.91	8.10	.14	.00	.27	.00	.00
1-2	.00	1.19	3.25	1.33	1.79	.83	.80	.00
2-3	.00	.00	.25	1.18	.25	.20	.00	.00
3-4	.00	.00	.20	.87	.50	.48	.30	.00
4-5	.00	.00	.10	.29	.27	.28	.00	.00
5-6	.00	.00	.00	.00	.27	.23	.00	.00
6-7	.00	.00	.00	.00	.01	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	4.10	11.90	3.80	3.10	2.30	1.10	.00
								26.30



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	4.35	7.20	.38	.00	.00	.00	.00
1-2	.00	1.75	1.35	1.78	1.18	.00	.00	.00
2-3	.00	.00	.15	.38	.22	.00	.00	.00
3-4	.00	.00	.00	.37	.30	.00	.30	.00
4-5	.00	.00	.00	.34	.00	.00	.00	.00
5-6	.00	.00	.00	.25	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.10	8.70	3.50	1.70	.00	.30	.00
								20.30

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	2.31	6.20	2.07	.00	.00	.00	10.58
1-2	.00	.39	1.20	1.49	.19	.30	.00	3.57
2-3	.00	.00	.00	1.29	.41	.30	.00	2.00
3-4	.00	.00	.00	.65	.30	.00	.00	.95
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.70	7.40	5.50	.90	.60	.00	17.10

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	1.70	.30	.00	.00	.00	2.00
1-2	.00	.00	.00	1.02	.30	.00	.00	1.32
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	1.70	1.40	.30	.00	.00	4.20



SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	.00	.00	.00	.00

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.04	.00	.00	.00	.00	.04
1-2	.00	.13	.26	.00	.00	.00	.00	.39
2-3	.00	.17	.12	.07	.00	.00	.00	.36
3-4	.00	.00	.18	.32	.00	.01	.00	.51
4-5	.00	.00	.00	.21	.00	.29	.00	.50
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.30	.60	.60	.00	.30	.00	1.80

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.30	2.75	.31	.00	.00	.00	.00
1-2	.00	.00	.35	.29	.00	.00	.00	.00
2-3	.00	.00	.20	.04	.41	.50	.00	.47
3-4	.00	.00	.00	.26	.19	.10	.00	.13
4-5	.00	.00	.00	.00	.14	.22	.12	.00
5-6	.00	.00	.00	.00	.16	.08	.18	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.30	3.30	.90	.90	.90	.30	.60
								7.20



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	1.51	4.10	.22	.00	.00	.00	.00
1-2	.00	.09	1.30	1.15	1.10	.00	.00	.00
2-3	.00	.00	.00	.77	.00	.00	.00	.00
3-4	.00	.00	.00	.05	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.60	5.40	2.20	1.10	.00	.00	10.30

SNUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)					TOTAL		
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	2.20	3.02	.00	.00	.00	.00
1-2	.00	.00	.00	1.38	.60	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	2.20	4.40	.60	.00	.00	.00
								7.20

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.86	4.18	.65	.25	.00	.00	5.86
1-2	.00	.54	1.20	2.25	1.85	.00	.00	6.63
2-3	.00	.00	.00	.25	.55	.00	.00	.79
3-4	.00	.00	.00	.85	.16	.00	.00	1.02
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.40	5.38	4.00	2.88	.88	.00	14.30



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 135.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.01
1-2	.00	.00	.03	.02	.00	.00	.00	.05
2-3	.00	.00	.02	.00	.03	.04	.00	.13
3-4	.00	.00	.02	.02	.02	.01	.00	.07
4-5	.00	.00	.01	.00	.01	.02	.01	.05
5-6	.00	.00	.00	.00	.01	.01	.02	.04
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.07	.05	.07	.07	.02	.35

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 157.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.02	.00	.00	.00	.00	.02
2-3	.00	.00	.01	.01	.00	.00	.00	.02
3-4	.00	.00	.01	.03	.00	.00	.00	.04
4-5	.00	.00	.00	.02	.00	.02	.00	.04
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.05	.05	.00	.02	.00	.12

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	3.94	.67	.02	.04	.00	.81
1-2	.00	.01	1.46	1.39	.87	.35	.19	.84
2-3	.00	.01	.15	.76	.31	.19	.03	.00
3-4	.00	.00	.00	.53	.24	.12	.05	.00
4-5	.00	.00	.00	.29	.22	.06	.00	.00
5-6	.00	.00	.00	.15	.14	.09	.01	.00
6-7	.00	.00	.00	.03	.03	.06	.02	.00
7-9	.00	.00	.00	.00	.10	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.02	5.55	3.82	1.92	.92	.30	.05
								12.59



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 202.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	1.57	.00	.00	.00	.00	.00	1.57
1-2	.00	.55	.00	.00	.00	.00	.00	.55
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.12	.00	.00	.00	.00	.00	2.12

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	11.60	7.46	2.09	.74
1-2	.00	.00	.00	.00	15.19	13.65	3.48	.67
2-3	.00	.00	.00	.00	4.43	4.26	2.00	.38
3-4	.00	.00	.00	.00	.74	.44	.58	.20
4-5	.00	.00	.00	.00	.13	.04	.07	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	32.08	25.84	8.23	2.00
								68.16

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0-1	.00	.00	.00	.00	26.27	27.52	8.07	4.13	65.99
1-2	.00	.00	.00	.00	26.07	29.09	12.22	1.41	68.79
2-3	.00	.00	.00	.00	4.59	6.89	5.30	.96	17.74
3-4	.00	.00	.00	.00	.00	.40	1.37	.00	1.84
4-5	.00	.00	.00	.00	.00	.00	.54	.00	.54
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	57.00	63.90	27.50	6.50	154.90



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	22.13	19.95	7.00	2.83
1-2	.00	.00	.00	.00	12.94	28.86	6.45	1.31
2-3	.00	.00	.00	.00	1.72	3.40	2.58	.16
3-4	.00	.00	.00	.00	.30	.00	.17	.47
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	37.10	52.20	16.20	4.30
								109.00

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	.00	.00	29.61	6.53	2.83	.37	39.33
1-2	.00	.00	.00	.00	45.76	27.19	3.16	1.97	78.07
2-3	.00	.00	.00	.00	13.06	18.73	2.97	1.56	36.32
3-4	.00	.00	.00	.00	2.58	3.20	2.10	.34	8.22
4-5	.00	.00	.00	.00	.39	.36	.25	.06	1.05
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	91.40	56.00	11.30	4.30	163.00

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0-1	.00	.00	.00	.00	13.31	11.69	1.91	.55	27.46
1-2	.00	.00	.00	.00	33.91	34.54	6.33	1.21	75.98
2-3	.00	.00	.00	.00	14.83	10.88	5.94	.44	32.10
3-4	.00	.00	.00	.00	2.49	1.03	.81	.00	4.33
4-5	.00	.00	.00	.00	.56	.07	.00	.00	.63
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	65.10	58.20	15.00	2.20	140.50



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	29.84	17.52	3.29	.83
1-2	.00	.00	.00	.00	32.28	29.87	10.22	2.88
2-3	.00	.00	.00	.00	9.27	7.35	6.11	1.49
3-4	.00	.00	.00	.00	.94	.36	2.07	1.70
4-5	.00	.00	.00	.00	.17	.00	.10	.28
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	72.50	55.10	21.80	6.10
								155.50

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	18.00	6.27	2.00	.14
1-2	.00	.00	.00	.00	31.28	14.25	3.37	.06
2-3	.00	.00	.00	.00	9.71	3.82	1.16	.00
3-4	.00	.00	.00	.00	2.48	.36	.46	.40
4-5	.00	.00	.00	.00	.43	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	61.90	24.70	7.00	.60
								94.20

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 140.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.33
1-2	.00	.00	.00	.00	.00	.00	.00	.19
2-3	.00	.00	.00	.00	.00	.00	.00	.11
3-4	.00	.00	.00	.00	.00	.00	.00	.04
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	.00	.00	.00	.67



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 150.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	2.70	2.11	1.27	.12
1-2	.00	.00	.00	.00	4.23	4.32	1.74	.32
2-3	.00	.00	.00	.00	2.00	1.80	.77	.07
3-4	.00	.00	.00	.00	.65	.36	.24	.00
4-5	.00	.00	.00	.00	.13	.04	.07	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	9.71	8.62	4.08	.52
								22.93

**SHUGGLERS COVE (50 FT DEPTH)**  
**CUMULATIVE SOUTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD**  
**DEVELOPED FROM MARINE ADVISERS HINDCAST**  
**POTENTIAL LNG TERMINAL SITE**  
**WAVE DIRECTION = 160.00**

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	1.53	1.94	.58	.21
1-2	.00	.00	.00	.00	1.63	2.51	.73	.03
2-3	.00	.00	.00	.00	.40	.64	.25	.08
3-4	.00	.00	.00	.00	.06	.07	.22	.13
4-5	.00	.00	.00	.00	.00	.00	.01	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	3.62	5.16	1.79	.46
								11.02

SHUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 170.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	3.14	1.66	.12	.07
1-2	.00	.00	.00	.00	3.54	4.18	.70	.11
2-3	.00	.00	.00	.00	.58	1.54	.79	.09
3-4	.00	.00	.00	.00	.03	.02	.12	.03
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	7.28	7.39	1.72	16.70



SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	2.47	1.75	.12	.01
1-2	.00	.00	.00	.00	2.70	2.64	.31	.02
2-3	.00	.00	.00	.00	.71	.28	.20	.02
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	5.87	4.67	.63	.05
								11.22

SMUGGLERS COVE (50 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 190.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	1.77	.00	.00	.00
1-2	.00	.00	.00	.00	3.09	.00	.00	.00
2-3	.00	.00	.00	.00	.74	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	5.60	.00	.00	5.60

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.11	.00	.00	.00	.00	.00	.00	.00	.11
1-2	1.77	.12	.00	.00	.00	.00	.00	.00	1.89
2-3	2.52	1.31	.00	.00	.00	.00	.00	.00	3.83
3-4	.60	1.76	.02	.00	.00	.00	.00	.00	2.38
4-5	.05	1.21	.02	.00	.00	.00	.00	.00	1.28
5-6	.00	.38	.05	.00	.00	.00	.00	.00	.43
6-7	.00	.21	.12	.00	.00	.00	.00	.00	.32
7-9	.00	.09	.19	.00	.00	.00	.00	.00	.28
9-11	.00	.02	.06	.00	.00	.00	.00	.00	.08
11-13	.00	.00	.02	.00	.00	.00	.00	.00	.02
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.05	5.11	.47	.00	.00	.00	.00	.00	10.62



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.27	.00	.00	.00	.00	.00	.00	.27
1-2	2.91	.31	.00	.00	.00	.00	.00	3.21
2-3	4.19	1.57	.00	.00	.00	.00	.00	5.76
3-4	1.93	2.95	.00	.00	.00	.00	.00	4.88
4-5	.30	3.02	.00	.00	.00	.00	.00	3.32
5-6	.00	1.46	.00	.00	.00	.00	.00	1.53
6-7	.00	.99	.36	.00	.00	.00	.00	1.35
7-9	.00	.00	.36	.00	.00	.00	.00	.36
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	9.60	10.30	.80	.00	.00	.00	.00	20.70

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.33	.00	.00	.00	.00	.00	.00	.33
1-2	3.61	.95	.00	.00	.00	.00	.00	4.55
2-3	4.16	3.01	.00	.00	.00	.00	.00	7.17
3-4	.00	3.05	.00	.00	.00	.00	.00	3.05
4-5	.30	1.73	.09	.00	.00	.00	.00	2.11
5-6	.00	.91	.28	.00	.00	.00	.00	1.19
6-7	.00	.15	.61	.00	.00	.00	.00	.77
7-9	.00	.84	1.43	.00	.00	.00	.00	2.28
9-11	.00	.26	.67	.00	.00	.00	.00	.93
11-13	.00	.00	.21	.00	.00	.00	.00	.21
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	8.40	10.90	3.30	.00	.00	.00	.00	22.60

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.50	.00	.00	.00	.00	.00	.00	.50
1-2	3.36	.02	.00	.00	.00	.00	.00	3.38
2-3	4.21	2.09	.00	.00	.00	.00	.00	6.30
3-4	1.03	3.11	.00	.00	.00	.00	.00	4.14
4-5	.00	2.51	.00	.00	.00	.00	.00	2.51
5-6	.00	.59	.00	.00	.00	.00	.00	.59
6-7	.00	.28	.06	.00	.00	.00	.00	.34
7-9	.00	.00	.24	.00	.00	.00	.00	.24
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	9.10	8.60	.30	.00	.00	.00	.00	18.00



SNUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.02	.00	.00	.00	.00	.00	.00	.00	.02
1-2	1.34	.05	.00	.00	.00	.00	.00	.00	1.40
2-3	1.70	.94	.00	.00	.00	.00	.00	.00	2.64
3-4	1.63	1.55	.00	.00	.00	.00	.00	.00	3.18
4-5	.00	1.36	.09	.00	.00	.00	.00	.00	1.45
5-6	.00	.19	.24	.00	.00	.00	.00	.00	.43
6-7	.00	.31	.18	.00	.00	.00	.00	.00	.49
7-9	.00	.00	.10	.00	.00	.00	.00	.00	.10
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	4.70	4.40	.60	.00	.00	.00	.00	.00	9.70

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.04	.00	.00	.00	.00	.00	.00	.04
1-2	1.68	.00	.00	.00	.00	.00	.00	1.68
2-3	2.39	.00	.00	.00	.00	.00	.00	2.39
3-4	.99	.03	.20	.00	.00	.00	.00	1.22
4-5	.00	.78	.10	.00	.00	.00	.00	.88
5-6	.00	.28	.00	.00	.00	.00	.00	.28
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.10	1.10	.30	.00	.00	.00	.00	6.50

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.75	.00	.00	.00	.00	.00	.00	.75
2-3	1.25	.00	.00	.00	.00	.00	.00	1.25
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	2.00	.00	.00	.00	.00	.00	.00	2.00



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.03	.00	.00	.00	.00	.00	.00	.00	.03
1-2	1.18	.00	.00	.00	.00	.00	.00	.00	1.18
2-3	1.59	.09	.00	.00	.00	.00	.00	.00	1.68
3-4	.60	.21	.00	.00	.00	.00	.00	.00	.81
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	3.40	.30	.00	.00	.00	.00	.00	.00	3.70

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.02	.00	.00	.00	.00	.00	.00	.02
1-2	1.05	.00	.00	.00	.00	.00	.00	1.05
2-3	2.19	.09	.00	.00	.00	.00	.00	2.28
3-4	.23	.21	.00	.00	.00	.00	.00	.45
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	3.50	.30	.00	.00	.00	.00	.00	3.80

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	PERIOD (SEC)				16-18	>18	TOTAL
				10-12	12-14	14-16				
0-1	.02	.00	.00	.00	.00	.00	.00	.00	.00	.02
1-2	.62	.00	.00	.00	.00	.00	.00	.00	.00	.62
2-3	.55	.00	.00	.00	.00	.00	.00	.00	.00	.55
3-4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.20	.00	.00	.00	.00	.00	.00	.00	.00	1.20



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.04	.00	.00	.00	.00	.00	.00	.00	.04
1-2	1.98	.00	.00	.00	.00	.00	.00	.00	1.98
2-3	3.08	.04	.00	.00	.00	.00	.00	.00	3.12
3-4	.50	.77	.00	.00	.00	.00	.00	.00	1.27
4-5	.00	.29	.00	.00	.00	.00	.00	.00	.29
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.60	1.10	.00	.00	.00	.00	.00	.00	6.70

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.65	.03	.00	.00	.00	.00	.00	.68
2-3	1.45	1.74	.00	.00	.00	.00	.00	3.20
3-4	.00	2.53	.00	.00	.00	.00	.00	2.53
4-5	.00	2.44	.00	.00	.00	.00	.00	2.44
5-6	.00	.81	.00	.00	.00	.00	.00	.81
6-7	.00	.76	.00	.00	.00	.00	.00	.76
7-9	.00	.29	.00	.00	.00	.00	.00	.29
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	2.10	8.60	.00	.00	.00	.00	.00	10.70

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.14	.12	.00	.00	.00	.00	.00	2.25
2-3	3.46	6.18	.00	.00	.00	.00	.00	9.65
3-4	.30	6.72	.00	.00	.00	.00	.00	7.02
4-5	.00	2.40	.00	.00	.00	.00	.00	2.40
5-6	.00	.28	.02	.00	.00	.00	.00	.31
6-7	.00	.00	.18	.00	.00	.00	.00	.18
7-9	.00	.00	.10	.00	.00	.00	.00	.10
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	5.90	15.70	.30	.00	.00	.00	.00	21.90



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE

WAVE DIRECTION = .00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.34	.00	.00	.00	.00	.00	.00	.34
2-3	.59	.16	.00	.00	.00	.00	.00	.75
3-4	.05	.19	.00	.00	.00	.00	.00	.24
4-5	.00	.06	.00	.00	.00	.00	.00	.06
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.98	.41	.00	.00	.00	.00	.00	1.39

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 45.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.07	.04	.00	.00	.00	.00	.00	.12
2-3	.21	.05	.00	.00	.00	.00	.00	1.06
3-4	.11	1.03	.00	.00	.00	.00	.00	1.14
4-5	.02	.50	.00	.00	.00	.00	.00	.60
5-6	.00	.20	.00	.00	.00	.00	.00	.20
6-7	.00	.06	.00	.00	.00	.00	.00	.06
7-9	.00	.02	.00	.00	.00	.00	.00	.02
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.42	2.79	.00	.00	.00	.00	.00	3.21

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 135.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.16	.00	.00	.00	.00	.00	.00	.16
2-3	.26	.00	.00	.00	.00	.00	.00	.26
3-4	.07	.00	.00	.00	.00	.00	.00	.15
4-5	.00	.13	.00	.00	.00	.00	.00	.13
5-6	.00	.07	.00	.00	.00	.00	.00	.07
6-7	.00	.05	.01	.00	.00	.00	.00	.06
7-9	.00	.00	.05	.00	.00	.00	.00	.05
9-11	.00	.00	.05	.00	.00	.00	.00	.05
11-13	.00	.00	.02	.00	.00	.00	.00	.02
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.49	.33	.12	.00	.00	.00	.00	.95



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 157.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.19	.00	.00	.00	.00	.00	.00	.19
3-4	.07	.03	.00	.00	.00	.00	.00	.10
4-5	.00	.11	.00	.00	.00	.00	.00	.11
5-6	.00	.03	.00	.00	.00	.00	.00	.03
6-7	.00	.02	.01	.00	.00	.00	.00	.03
7-9	.00	.00	.02	.00	.00	.00	.00	.02
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.34	.19	.02	.00	.00	.00	.00	.56

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.37	.00	.00	.00	.00	.00	.00	.37
2-3	.60	.02	.00	.00	.00	.00	.00	.62
3-4	.14	.15	.00	.00	.00	.00	.00	.29
4-5	.00	.18	.00	.00	.00	.00	.00	.18
5-6	.00	.04	.01	.00	.00	.00	.00	.05
6-7	.00	.04	.07	.00	.00	.00	.00	.12
7-9	.00	.00	.11	.00	.00	.00	.00	.11
9-11	.00	.00	.01	.00	.00	.00	.00	.01
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.12	.43	.20	.00	.00	.00	.00	1.75

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 202.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.12	.00	.00	.00	.00	.00	.00	.12
3-4	.05	.03	.00	.00	.00	.00	.00	.08
4-5	.02	.04	.01	.00	.00	.00	.00	.08
5-6	.00	.00	.04	.00	.00	.00	.00	.05
6-7	.00	.03	.03	.00	.00	.00	.00	.05
7-9	.00	.07	.01	.00	.00	.00	.00	.08
9-11	.00	.02	.00	.00	.00	.00	.00	.02
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.19	.19	.09	.00	.00	.00	.00	.47



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 225.00

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.11	.00	.00	.00	.00	.00	.00	.00	.11
1-2	.74	.00	.00	.00	.00	.00	.00	.00	.82
2-3	.55	.28	.00	.00	.00	.00	.00	.00	.83
3-4	.11	.25	.00	.00	.00	.00	.00	.00	.36
4-5	.00	.11	.00	.00	.00	.00	.00	.00	.11
5-6	.00	.03	.00	.00	.00	.00	.00	.00	.03
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.51	.76	.00	.00	.00	.00	.00	.00	2.27

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.01	.64	.23	.02	.21	.20	.03
1-2	.00	1.26	3.00	1.30	.77	.30	.07	.02
2-3	.00	.67	1.13	.63	.40	.21	.01	.02
3-4	.00	.21	.64	.61	.23	.14	.01	.02
4-5	.00	.00	.23	.43	.23	.11	.01	.00
5-6	.00	.00	.02	.32	.16	.04	.02	.00
6-7	.00	.00	.00	.21	.09	.01	.00	.00
7-9	.00	.00	.00	.19	.11	.00	.00	.00
9-11	.00	.00	.00	.02	.00	.00	.00	.02
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.15	5.67	3.92	2.00	1.02	.32	.10
								15.19

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.55	.50	.40
1-2	.00	2.78	4.65	1.58	1.53	1.35	.00	.20
2-3	.00	1.78	2.70	1.55	1.37	.30	.15	.00
3-4	.00	.44	1.25	1.93	.20	.15	.15	.00
4-5	.00	.00	.69	1.36	1.17	.37	.00	.00
5-6	.00	.00	.00	.93	.78	.07	.00	.00
6-7	.00	.00	.00	.96	.25	.00	.00	.00
7-9	.00	.00	.00	.19	.30	.00	.00	.00
9-11	.00	.00	.00	.11	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	5.00	9.30	8.60	5.60	2.80	.80	.60
								32.70



SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.39	.00	.00	.75	1.10	.00
1-2	.00	1.44	3.17	2.00	1.07	1.05	.30	.00
2-3	.00	1.61	3.55	2.24	1.23	1.27	.00	.00
3-4	.00	.44	2.68	2.17	1.30	.52	.00	.00
4-5	.00	.00	1.22	1.33	.83	.75	.00	.00
5-6	.00	.00	.27	1.43	.92	.15	.00	.00
6-7	.00	.00	.01	1.13	.65	.00	.00	.00
7-9	.00	.00	.00	1.00	1.00	.00	.00	.00
9-11	.00	.00	.00	.11	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	3.50	12.30	12.20	7.00	4.50	1.40	40.90

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.70	.00	.00
1-2	.00	2.75	7.30	.64	1.70	.40	.30	.00
2-3	.00	.06	3.04	.09	.20	.67	.00	.00
3-4	.00	.49	.92	.98	.50	.37	.00	.00
4-5	.00	.00	.64	.57	.30	.15	.00	.00
5-6	.00	.00	.00	.50	.25	.00	.00	.00
6-7	.00	.00	.00	.22	.15	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	4.10	11.90	3.00	3.10	2.30	1.10	.00
								26.30

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	9-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.65	.00	.00	.00	.00	.65
1-2	.00	3.18	5.42	1.50	1.00	.00	.30	11.41
2-3	.00	2.20	1.70	.72	.40	.00	.00	5.02
3-4	.00	.72	.67	.18	.20	.00	.00	1.76
4-5	.00	.00	.26	.34	.10	.00	.00	.69
5-6	.00	.00	.00	.24	.00	.00	.00	.24
6-7	.00	.00	.00	.24	.00	.00	.00	.24
7-9	.00	.00	.00	.28	.00	.00	.00	.28
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.10	8.70	3.50	1.70	.00	.30	20.30



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.31	1.06	.00	.15	.00	.00
1-2	.00	2.15	4.68	1.85	.10	.45	.00	.00
2-3	.00	.48	.73	.72	.50	.00	.00	.00
3-4	.00	.07	.76	.85	.20	.00	.00	.00
4-5	.00	.00	.00	.75	.10	.00	.00	.00
5-6	.00	.00	.00	.27	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.70	7.40	5.50	.90	.60	.00	17.10

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	1.70	1.40	.30	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	1.70	1.40	.30	.00	.00	.00

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	.00	.00	.00	.00



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.06	.00	.00	.00	.00	.06
1-2	.00	.04	.24	.00	.00	.00	.00	.28
2-3	.00	.26	.17	.22	.00	.00	.00	.65
3-4	.00	.00	.13	.37	.00	.30	.00	.80
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.30	.60	.60	.00	.30	.00	1.80

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.18	2.23	.21	.00	.00	.00	.00
1-2	.00	.12	.81	.39	.05	.00	.00	.00
2-3	.00	.00	.25	.11	.55	.22	.00	.30
3-4	.00	.00	.00	.19	.05	.38	.00	.30
4-5	.00	.00	.00	.00	.25	.00	.06	.00
5-6	.00	.00	.00	.00	.00	.22	.24	.00
6-7	.00	.00	.00	.00	.00	.08	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.30	3.30	.90	.90	.90	.30	.60
								7.20

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.15	.00	.00	.00	.00	1.15
1-2	.00	1.35	2.85	.85	1.10	.00	.00	6.15
2-3	.00	.25	.91	.63	.00	.00	.00	1.79
3-4	.00	.00	.50	.52	.00	.00	.00	1.02
4-5	.00	.00	.00	.20	.00	.00	.00	.20
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.60	5.40	2.20	1.10	.00	.00	10.30



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.90	1.47	.00	.00	.00	.00
1-2	.00	.00	1.30	2.93	.60	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	2.20	4.40	.60	.00	.00	7.20

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	.00	.00	.20	.40	.00	.60
1-2	.00	.44	3.99	2.49	1.80	.40	.00	9.12
2-3	.00	.66	.55	.41	.50	.00	.00	2.12
3-4	.00	.30	.76	.10	.30	.00	.00	1.47
4-5	.00	.00	.00	.57	.00	.00	.00	.57
5-6	.00	.00	.00	.43	.00	.00	.00	.43
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.40	5.30	4.00	2.80	.80	.00	14.30

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 157.50

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.03	.02	.00	.00	.00	.00	.05
2-3	.00	.00	.02	.01	.05	.02	.00	.02	.12
3-4	.00	.00	.01	.02	.00	.03	.00	.02	.06
4-5	.00	.00	.02	.00	.02	.00	.01	.00	.04
5-6	.00	.00	.00	.00	.00	.02	.02	.00	.04
6-7	.00	.00	.00	.00	.00	.01	.00	.00	.01
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.07	.05	.07	.07	.02	.05	.35



SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.03
1-2	.00	.00	.02	.00	.00	.00	.00	.02
2-3	.00	.02	.01	.02	.00	.00	.00	.00
3-4	.00	.00	.01	.03	.00	.02	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.02	.05	.05	.00	.02	.00	.05

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 202.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.21	.20	.00
1-2	.00	.00	.00	.00	.00	.30	.07	.00
2-3	.00	.00	.00	.00	.00	.19	.01	.00
3-4	.00	.00	.00	.00	.00	.09	.01	.00
4-5	.00	.00	.00	.00	.00	.11	.00	.00
5-6	.00	.00	.00	.00	.00	.02	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	.00	.92	.30	.00
								1.22

SHUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE

WAVE DIRECTION = 225.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.01	.63	.23	.02	.00	.00	.00
1-2	.00	1.25	2.96	1.28	.77	.00	.00	.00
2-3	.00	.65	1.10	.60	.35	.00	.00	.00
3-4	.00	.21	.62	.56	.22	.00	.00	.00
4-5	.00	.00	.22	.43	.21	.00	.00	.00
5-6	.00	.00	.02	.32	.16	.00	.00	.00
6-7	.00	.00	.00	.21	.09	.00	.00	.00
7-9	.00	.00	.00	.19	.11	.00	.00	.00
9-11	.00	.00	.00	.02	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.12	5.55	3.82	1.92	.00	.00	13.42



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	14.77	9.34	2.58	.74
1-2	.00	.00	.00	.00	14.65	12.05	3.89	.74
2-3	.00	.00	.00	.00	2.42	3.50	1.40	.44
3-4	.00	.00	.00	.00	.25	.81	.28	.06
4-5	.00	.00	.00	.00	.00	.12	.09	.01
5-6	.00	.00	.00	.00	.00	.01	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	32.08	25.84	8.23	2.00
								68.16

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0-1	.00	.00	.00	.00	32.50	32.35	9.77	3.90	78.52
1-2	.00	.00	.00	.00	23.27	25.45	13.01	2.33	64.05
2-3	.00	.00	.00	.00	1.23	5.85	2.56	.27	9.92
3-4	.00	.00	.00	.00	.00	.25	1.45	.00	1.71
4-5	.00	.00	.00	.00	.00	.00	.70	.00	.70
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	57.00	63.90	27.50	6.50	154.90

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	26.31	23.90	7.80	3.10
1-2	.00	.00	.00	.00	9.95	25.46	7.31	1.00
2-3	.00	.00	.00	.00	.84	2.84	.90	.20
3-4	.00	.00	.00	.00	.00	.00	.19	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	37.10	52.20	16.20	4.30
								109.80



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	38.61	8.81	2.82	.36
1-2	.00	.00	.00	.00	44.61	27.65	4.00	1.93
2-3	.00	.00	.00	.00	7.40	13.12	3.41	1.36
3-4	.00	.00	.00	.00	.79	5.06	.76	.52
4-5	.00	.00	.00	.00	.00	1.26	.32	.13
5-6	.00	.00	.00	.00	.00	.10	.00	.10
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	91.40	56.00	11.30	4.30
								163.00

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	18.31	16.50	2.81	.60
1-2	.00	.00	.00	.00	37.62	29.38	7.73	1.24
2-3	.00	.00	.00	.00	8.19	9.30	4.17	.36
3-4	.00	.00	.00	.00	.97	2.76	.29	.00
4-5	.00	.00	.00	.00	.00	.24	.00	.24
5-6	.00	.00	.00	.00	.00	.02	.00	.02
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	65.10	58.20	15.00	2.20
								140.50

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0-1	.00	.00	.00	.00	37.25	22.55	5.18	.83	65.82
1-2	.00	.00	.00	.00	30.01	25.16	11.31	2.30	68.78
2-3	.00	.00	.00	.00	4.89	6.57	4.73	2.75	18.94
3-4	.00	.00	.00	.00	.35	.81	.58	.22	1.96
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	72.50	55.10	21.80	6.10	155.50



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	24.20	7.93	2.56	.13
1-2	.00	.00	.00	.00	30.36	11.54	3.27	.07
2-3	.00	.00	.00	.00	6.46	4.35	1.08	.40
3-4	.00	.00	.00	.00	.87	.88	.10	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	61.90	24.70	7.00	.50
								94.20

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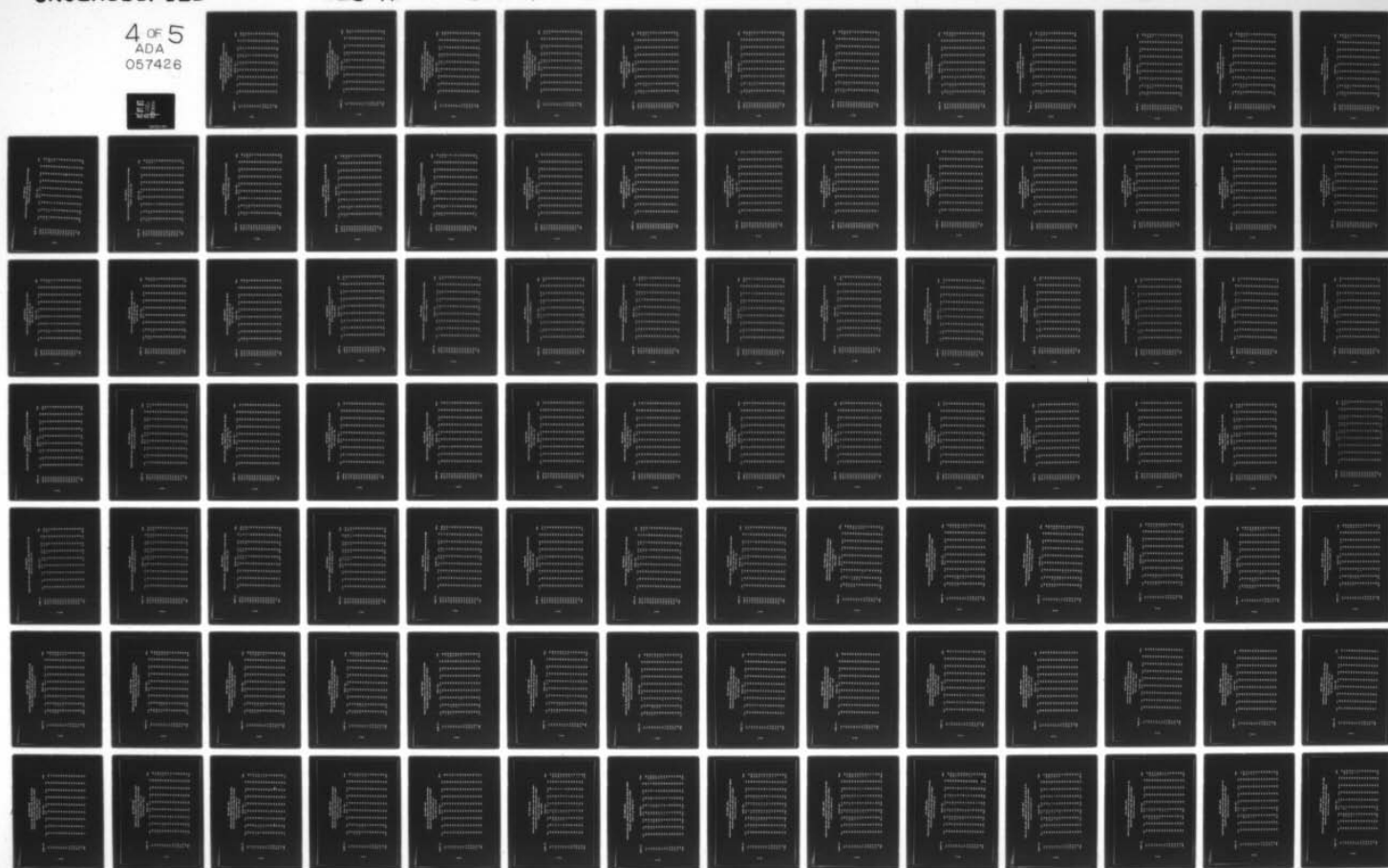
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 13/10  
PRELIMINARY EVALUATION OF WIND AND WAVE EFFECTS AT POTENTIAL LN--ETC(U).  
JUL 78 L Z HALE

UNCLASSIFIED

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SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 160.00

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	.00	.00	3.43	1.93	1.28	.31	6.95
1-2	.00	.00	.00	.00	4.65	3.57	1.76	.50	10.48
2-3	.00	.00	.00	.00	1.38	2.18	.69	.16	4.41
3-4	.00	.00	.00	.00	.25	.81	.27	.06	1.39
4-5	.00	.00	.00	.00	.00	.12	.09	.01	.22
5-6	.00	.00	.00	.00	.00	.01	.00	.00	.01
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	9.71	8.62	4.08	1.04	23.46



SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 170.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	2.02	1.60	.71	.14
1-2	.00	.00	.00	.00	1.45	1.28	.46	.03
2-3	.00	.00	.00	.00	.14	.08	.05	.00
3-4	.00	.00	.00	.00	.00	.00	.01	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	3.62	3.04	1.23	.17
								8.06

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	3.82	2.24	.31	.23
1-2	.00	.00	.00	.00	3.11	2.66	.63	.09
2-3	.00	.00	.00	.00	.36	.56	.32	.22
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	7.28	5.47	1.26	.54
								14.55

SMUGGLERS COVE (120 FT DEPTH)  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM MARINE ADVISERS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 190.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	5.50	3.49	.29	.06
1-2	.00	.00	.00	.00	5.44	4.53	1.03	.12
2-3	.00	.00	.00	.00	.54	.68	.34	.07
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	11.47	8.71	1.66	.25
								22.09



CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
ANNUAL SUMMARY

HEIGHT (M)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	4.40	.45	.00	.00	.00	.00	.00	.00	4.85
1.0-1.5	11.67	4.99	.00	.00	.00	.00	.00	.00	16.66
1.5-2.0	1.17	6.43	.64	.00	.00	.00	.00	.00	8.23
2.0-2.5	.02	1.24	.90	.01	.00	.00	.00	.00	2.18
2.5-3.0	.00	.10	.25	.03	.00	.00	.00	.00	.39
3.0-3.5	.00	.01	.04	.02	.00	.00	.00	.00	.06
3.5-4.0	.00	.00	.01	.00	.00	.00	.00	.00	.01
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.01
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.26	13.23	1.85	.06	.00	.00	.00	.00	32.39

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	3.50	.11	.00	.00	.00	.00	.00	.00	3.61
1.0-1.5	9.55	1.24	.00	.00	.00	.00	.00	.00	10.78
1.5-2.0	1.50	2.21	.03	.00	.00	.00	.00	.00	3.73
2.0-2.5	.05	1.10	.09	.00	.00	.00	.00	.00	1.23
2.5-3.0	.00	.33	.23	.00	.00	.00	.00	.00	.55
3.0-3.5	.00	.02	.16	.00	.00	.00	.00	.00	.18
3.5-4.0	.00	.00	.08	.00	.00	.00	.00	.00	.08
4.0-4.5	.00	.00	.05	.00	.00	.00	.00	.00	.05
4.5-5.0	.00	.00	.01	.00	.00	.00	.00	.00	.01
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	14.59	5.00	.64	.00	.00	.00	.00	.00	20.22

CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	3.77	.18	.00	.00	.00	.00	.00	3.96
1.0-1.5	8.72	1.87	.00	.00	.00	.00	.00	10.59
1.5-2.0	1.51	3.28	.00	.00	.00	.00	.00	4.87
2.0-2.5	.00	1.49	.12	.00	.00	.00	.00	1.69
2.5-3.0	.00	.35	.08	.00	.00	.00	.00	.43
3.0-3.5	.00	.03	.02	.00	.00	.00	.00	.06
3.5-4.0	.00	.00	.02	.00	.00	.00	.00	.02
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	14.09	7.28	.32	.00	.00	.00	.00	21.61



CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	4.45	.48	.00	.00	.00	.00	.00	4.92
1.0-1.5	11.41	5.63	.00	.00	.00	.00	.00	17.04
1.5-2.0	1.89	7.85	.76	.00	.00	.00	.00	10.49
2.0-2.5	.06	1.50	1.10	.01	.00	.00	.00	2.75
2.5-3.0	.00	.16	.31	.06	.00	.00	.00	.53
3.0-3.5	.00	.00	.03	.02	.00	.00	.00	.05
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.00	15.70	2.21	.09	.00	.00	.00	35.00

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
POTENTIAL LNG TERMINAL SITE

HEIGHT (H)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	4.62	.52	.00	.00	.00	.00	.00	.00	5.14
1.0-1.5	13.75	5.98	.00	.00	.00	.00	.00	.00	19.73
1.5-2.0	1.31	7.72	.96	.00	.00	.00	.00	.00	9.99
2.0-2.5	.00	1.60	1.41	.00	.00	.00	.00	.00	3.01
2.5-3.0	.00	.06	.35	.00	.00	.00	.00	.00	.41
3.0-3.5	.00	.00	.04	.00	.00	.00	.00	.00	.04
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	19.68	15.88	2.76	.00	.00	.00	.00	.00	38.32

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	3.51	.81	.00	.00	.00	.00	.00	.00	4.32
1.0-1.5	12.28	10.28	.00	.00	.00	.00	.00	.00	22.49
1.5-2.0	.98	13.13	1.94	.00	.00	.00	.00	.00	16.05
2.0-2.5	.00	2.14	2.54	.05	.00	.00	.00	.00	4.73
2.5-3.0	.00	.00	.55	.15	.00	.00	.00	.00	.70
3.0-3.5	.00	.00	.07	.07	.00	.00	.00	.00	.15
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	16.77	26.29	5.10	.28	.00	.00	.00	.00	48.43



CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	3.02	.94	.00	.00	.00	.00	.00	3.96
1.0-1.5	13.12	10.87	.00	.00	.00	.00	.00	23.98
1.5-2.0	1.27	13.79	2.20	.00	.00	.00	.00	17.26
2.0-2.5	.00	2.46	3.11	.07	.00	.00	.00	5.64
2.5-3.0	.00	.02	.02	.13	.00	.00	.00	.97
3.0-3.5	.00	.00	.04	.07	.00	.00	.00	.11
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.41	28.08	6.17	.28	.00	.00	.00	51.93

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	5.82	.82	.00	.00	.00	.00	.00	.00	6.64
1.0-1.5	18.31	8.33	.01	.00	.00	.00	.00	.00	26.65
1.5-2.0	1.26	10.36	.56	.00	.00	.00	.00	.00	12.18
2.0-2.5	.00	1.51	.86	.00	.00	.00	.00	.00	2.37
2.5-3.0	.00	.00	.18	.00	.00	.00	.00	.00	.18
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	25.39	21.02	1.61	.00	.00	.00	.00	.00	48.02

CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	7.00	.75	.00	.00	.00	.00	.00	7.74
1.0-1.5	17.24	7.27	.00	.00	.00	.00	.00	24.50
1.5-2.0	1.12	7.27	.52	.00	.00	.00	.00	8.91
2.0-2.5	.00	.70	.73	.00	.00	.00	.00	1.52
2.5-3.0	.00	.00	.13	.00	.00	.00	.00	.13
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	25.35	16.06	1.38	.00	.00	.00	.00	42.00



CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	5.13	.33	.00	.00	.00	.00	.00	5.46
1.0-1.5	12.26	3.50	.00	.00	.00	.00	.00	15.76
1.5-2.0	.49	4.39	.35	.00	.00	.00	.00	5.23
2.0-2.5	.00	.69	.41	.00	.00	.00	.00	1.10
2.5-3.0	.00	.00	.16	.00	.00	.00	.00	.16
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.88	8.91	.92	.00	.00	.00	.00	27.71

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	5.44	.28	.00	.00	.00	.00	.00	5.72
1.0-1.5	9.45	2.74	.00	.00	.00	.00	.00	12.20
1.5-2.0	.77	3.28	.15	.00	.00	.00	.00	4.20
2.0-2.5	.03	.32	.34	.00	.00	.00	.00	.69
2.5-3.0	.00	.00	.15	.00	.00	.00	.00	.15
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	15.69	6.62	.64	.00	.00	.00	.00	22.96

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	3.47	.09	.00	.00	.00	.00	.00	3.55
1.0-1.5	7.03	1.22	.00	.00	.00	.00	.00	8.26
1.5-2.0	.78	2.09	.01	.00	.00	.00	.00	2.89
2.0-2.5	.00	.60	.07	.00	.00	.00	.00	.67
2.5-3.0	.00	.17	.02	.00	.00	.00	.00	.19
3.0-3.5	.00	.00	.02	.00	.00	.00	.00	.03
3.5-4.0	.00	.00	.01	.00	.00	.00	.00	.01
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	11.28	4.17	.14	.00	.00	.00	.00	15.59



CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	3.09	.00	.00	.00	.00	.00	.00	.00	3.17
1.0-1.5	6.92	1.05	.00	.00	.00	.00	.00	.00	7.98
1.5-2.0	1.10	1.82	.00	.00	.00	.00	.00	.00	3.00
2.0-2.5	.07	.62	.07	.01	.00	.00	.00	.00	.77
2.5-3.0	.00	.13	.04	.06	.00	.00	.00	.00	.23
3.0-3.5	.00	.03	.06	.02	.00	.00	.00	.00	.11
3.5-4.0	.00	.02	.03	.00	.00	.00	.00	.00	.05
4.0-4.5	.00	.00	.01	.00	.00	.00	.00	.00	.01
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	11.19	3.76	.27	.09	.00	.00	.00	.00	15.31

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 180

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.01	.00	.00	.00	.00	.00	.00	.01
1.0-1.5	.06	.00	.00	.00	.00	.00	.00	.06
1.5-2.0	.02	.00	.00	.00	.00	.00	.00	.02
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.10	.00	.00	.00	.00	.00	.00	.10

CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 190

HEIGHT (MD)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.01	.00	.00	.00	.00	.00	.00	.01
1.0-1.5	.13	.00	.00	.00	.00	.00	.00	.14
1.5-2.0	.05	.03	.00	.00	.00	.00	.00	.08
2.0-2.5	.00	.05	.00	.00	.00	.00	.00	.06
2.5-3.0	.00	.02	.00	.00	.00	.00	.00	.02
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.20	.11	.00	.00	.00	.00	.00	.32



CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 200

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.01	.00	.00	.00	.00	.00	.00	.01
1.0-1.5	.14	.00	.00	.00	.00	.00	.00	.14
1.5-2.0	.09	.04	.00	.00	.00	.00	.00	.13
2.0-2.5	.01	.07	.00	.00	.00	.00	.00	.08
2.5-3.0	.00	.02	.00	.00	.00	.00	.00	.03
3.0-3.5	.00	.00	.01	.00	.00	.00	.00	.01
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.26	.14	.01	.00	.00	.00	.00	.41

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION - 210

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.01	.00	.00	.00	.00	.00	.00	.02
1.0-1.5	.09	.01	.00	.00	.00	.00	.00	.10
1.5-2.0	.04	.03	.00	.00	.00	.00	.00	.06
2.0-2.5	.00	.04	.00	.00	.00	.00	.00	.04
2.5-3.0	.00	.01	.00	.00	.00	.00	.00	.01
3.0-3.5	.00	.00	.01	.00	.00	.00	.00	.01
3.5-4.0	.00	.00	.01	.00	.00	.00	.00	.01
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.14	.08	.02	.00	.00	.00	.00	.25

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 220

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.02	.00	.00	.00	.00	.00	.00	.02
1.0-1.5	.11	.00	.00	.00	.00	.00	.00	.12
1.5-2.0	.04	.02	.00	.00	.00	.00	.00	.06
2.0-2.5	.00	.04	.00	.00	.00	.00	.00	.04
2.5-3.0	.00	.02	.00	.00	.00	.00	.00	.02
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.18	.08	.00	.00	.00	.00	.00	.26



CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION - 230

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.05	.00	.00	.00	.00	.00	.00	.05
1.0-1.5	.16	.01	.00	.00	.00	.00	.00	.16
1.5-2.0	.03	.04	.00	.00	.00	.00	.00	.07
2.0-2.5	.00	.04	.00	.00	.00	.00	.00	.04
2.5-3.0	.00	.01	.00	.00	.00	.00	.00	.01
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.24	.10	.01	.00	.00	.00	.00	.34

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 240

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.00	.00	.00	.00	.00	.00	.00	.00
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	.00	.00	.00	.00

CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 250

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.04	.00	.00	.00	.00	.00	.00	.04
1.0-1.5	.14	.01	.00	.00	.00	.00	.00	.15
1.5-2.0	.06	.06	.00	.00	.00	.00	.00	.12
2.0-2.5	.00	.04	.00	.00	.00	.00	.00	.05
2.5-3.0	.00	.01	.01	.00	.00	.00	.00	.02
3.0-3.5	.00	.00	.01	.00	.00	.00	.00	.01
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.24	.12	.02	.00	.00	.00	.00	.39



CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 260

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.00	.00	.00	.00	.00	.00	.00	.00
1.0-1.5	.26	.01	.00	.00	.00	.00	.00	.27
1.5-2.0	.06	.06	.00	.00	.00	.00	.00	.12
2.0-2.5	.00	.03	.00	.01	.00	.00	.00	.04
2.5-3.0	.00	.01	.00	.02	.00	.00	.00	.03
3.0-3.5	.00	.00	.01	.01	.00	.00	.00	.02
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.40	.11	.01	.04	.00	.00	.00	.55

CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 270

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	.14	.10	.00	.00	.00	.00	.00	.24
1.0-1.5	.38	1.63	.00	.00	.00	.00	.00	2.01
1.5-2.0	.06	3.24	.16	.00	.00	.00	.00	3.45
2.0-2.5	.00	.71	.45	.01	.00	.00	.00	1.17
2.5-3.0	.00	.01	.18	.01	.00	.00	.00	.20
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.01
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.50	5.68	.79	.02	.00	.00	.00	7.00

CAMP PENDLETON  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 280

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	2.06	.35	.00	.00	.00	.00	.00	2.42
1.0-1.5	5.13	3.32	.00	.00	.00	.00	.00	8.45
1.5-2.0	.38	2.92	.48	.00	.00	.00	.00	3.78
2.0-2.5	.00	.22	.45	.00	.00	.00	.00	.67
2.5-3.0	.00	.00	.04	.00	.00	.00	.00	.04
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	7.58	6.80	.97	.00	.00	.00	.00	15.35



CAMP PENDLETON  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 290

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	.00	.00	.00	.00
0.5-1.0	1.95	.00	.00	.00	.00	.00	.00	1.95
1.0-1.5	5.06	.00	.00	.00	.00	.00	.00	5.06
1.5-2.0	.33	.00	.00	.00	.00	.00	.00	.33
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	7.35	.00	.00	.00	.00	.00	.00	7.35

CAMP PENDLETON  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
ANNUAL SUMMARY

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.62	7.40	1.49	1.28	9.69	5.69	1.32	.00
0.5-1.0	.04	.54	.14	.02	.14	.42	.53	.00
1.0-1.5	.00	.06	.02	.01	.00	.02	.18	.00
1.5-2.0	.00	.00	.01	.00	.00	.00	.04	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.66	8.01	1.67	1.31	9.83	6.13	2.07	.00
								29.68

CAMP PENDLETON  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.11	2.44	1.52	1.90	10.23	12.21	3.96	.00
0.5-1.0	.00	1.02	.30	.02	.25	.99	1.64	.00
1.0-1.5	.00	.16	.05	.03	.01	.06	.50	.00
1.5-2.0	.00	.00	.00	.02	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.18	3.62	1.87	1.97	18.48	13.26	6.10	.00
								45.47



CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.04	2.63	1.44	2.74	18.82	10.01	2.91	.00
0.5-1.0	.05	1.38	.63	.06	.29	.80	.72	.00
1.0-1.5	.00	.32	.07	.00	.01	.01	.07	.00
1.5-2.0	.00	.03	.03	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.09	4.36	2.20	2.79	19.12	10.82	3.71	.00
								43.09

CAMP PENDLETON  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	1.35	4.84	1.19	1.25	11.00	7.14	1.98	.00
0.5-1.0	.07	1.40	.24	.08	.16	.61	2.39	.00
1.0-1.5	.00	.04	.02	.04	.00	.04	1.27	.00
1.5-2.0	.00	.00	.02	.00	.00	.00	.39	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.01	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.42	6.28	1.47	1.37	11.96	7.79	6.05	.00
								36.34

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.58	6.55	1.56	.91	11.14	6.60	.75	.00
0.5-1.0	.02	.81	.04	.01	.53	.51	.16	.00
1.0-1.5	.00	.07	.00	.00	.01	.04	.15	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.12	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.01	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.60	7.44	1.61	.91	11.68	7.15	1.19	.00
								30.58



CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0.0-0.5	.85	15.69	1.68	.50	3.93	2.29	.51	.00	25.47
0.5-1.0	.07	.24	.01	.00	.00	.09	.09	.00	.49
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.92	15.93	1.70	.50	3.94	2.38	.60	.00	25.96

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	1.01	16.07	2.34	.14	1.33	.26	.00	.00
0.5-1.0	.00	.37	.04	.00	.00	.02	.00	.00
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.01	16.44	2.39	.14	1.33	.28	.00	.00
								21.57

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.87	15.45	1.55	.23	.50	.46	.00	.00
0.5-1.0	.00	.11	.01	.00	.01	.04	.00	.00
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.87	15.56	1.56	.23	.50	.50	.00	.00
								19.23



CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-9	9-10	10-12	12-14	14-16	16-18	
0.0-0.5	.87	11.08	1.79	.05	1.32	.78	.13	16.01
0.5-1.0	.00	.11	.00	.00	.01	.09	.05	.26
1.0-1.5	.00	.00	.00	.00	.00	.00	.01	.01
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.87	11.20	1.79	.05	1.33	.87	.18	16.28

# CAMP PENDLETON

## CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)						TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	>18
0.0-0.5	1.10	7.52	.78	.85	2.75	1.66	.51
0.5-1.0	.00	.01	.00	.07	.09	.12	.15
1.0-1.5	.00	.00	.00	.00	.00	.00	.02
1.5-2.0	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00
TOTAL	1.10	7.53	.78	.92	2.84	1.79	.69
							15.64

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.23	2.48	.73	1.51	0.83	4.13	.59	.00
0.5-1.0	.00	.04	.00	.00	.02	.22	.10	.00
1.0-1.5	.00	.00	.00	.00	.00	.01	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.23	2.53	.73	1.51	8.85	4.35	.69	.00
								18.88



CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.32	2.57	1.70	2.06	18.19	11.99	1.42	.00
0.5-1.0	.00	.50	.17	.00	.06	.60	.27	.00
1.0-1.5	.00	.09	.06	.03	.00	.02	.00	.00
1.5-2.0	.00	.00	.00	.01	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.32	3.15	1.93	2.10	18.24	12.61	1.70	.00
								40.05

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.13	1.46	1.63	3.25	19.46	10.73	3.03	.00
0.5-1.0	.19	.51	.25	.01	.22	.95	.79	.00
1.0-1.5	.00	.09	.07	.00	.00	.10	.12	.00
1.5-2.0	.00	.00	.02	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.32	2.05	1.97	3.25	19.71	11.78	3.94	.00
								43.03

CAMP PENDLETON  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 190

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.01	.00	.00	.00	.00	.00	.01
0.5-1.0	.00	.01	.00	.00	.00	.00	.00	.01
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.02	.00	.00	.00	.00	.00	.02



CAMP PENDLETON  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 200

HEIGHT (M)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0.0-0.5	.01	.05	.00	.00	.00	.00	.00	.00	.06
0.5-1.0	.02	.12	.00	.01	.00	.00	.00	.00	.15
1.0-1.5	.00	.02	.00	.00	.00	.00	.00	.00	.02
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.03	.19	.00	.01	.00	.00	.00	.00	.23

CAMP PENDLETON  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 210

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.01	.02	.00	.00	.00	.00	.03
0.5-1.0	.00	.03	.02	.00	.01	.00	.00	.05
1.0-1.5	.00	.01	.01	.00	.00	.00	.00	.02
1.5-2.0	.00	.00	.01	.00	.00	.00	.00	.01
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.05	.05	.00	.01	.00	.00	.11

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 220

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.04	.00	.00	.00	.00	.00	.05
0.5-1.0	.01	.05	.02	.00	.00	.00	.00	.07
1.0-1.5	.00	.01	.01	.00	.00	.00	.00	.02
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.01	.10	.03	.00	.00	.00	.00	.14



CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 230

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.01	.05	.00	.00	.00	.00	.01	.00
0.5-1.0	.00	.00	.01	.00	.01	.00	.17	.00
1.0-1.5	.00	.02	.00	.01	.00	.00	.12	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.04	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.02	.15	.02	.01	.01	.00	.34	.54

CAMP PENDLETON  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 240

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.01	.04	.02	.03	.01	2.21	.51	.00
0.5-1.0	.00	.00	.01	.01	.01	.35	.22	.00
1.0-1.5	.00	.01	.01	.00	.00	.02	.06	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.01	.13	.03	.04	.02	2.58	.79	.00
								3.60

CAMP PENDLETON  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 250

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.01	.15	.47	.75	4.31	3.47	.80	.00
0.5-1.0	.01	.05	.09	.01	.11	.07	.14	.00
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.02	.20	.55	.76	4.42	3.54	.94	.00
								10.43



CAMP PENDLETON  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 260

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0.0-0.5	.00	.10	.98	.50	5.37	.00	.00	6.95
0.5-1.0	.00	.02	.00	.00	.00	.00	.00	.02
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.12	.98	.50	5.37	.00	.00	6.97

CAMP PENDLETON  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 270

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.15	6.96	.00	.00	.00	.00	.00	.00
0.5-1.0	.00	.09	.00	.00	.00	.00	.00	.00
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.15	7.06	.00	.00	.00	.00	.00	7.21

CAMP PENDLETON  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 280

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.43	.00	.00	.00	.00	.00	.00	.43
0.5-1.0	.00	.00	.00	.00	.00	.00	.00	.00
1.0-1.5	.00	.00	.00	.00	.00	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.43	.00	.00	.00	.00	.00	.00	.43



CAMP PENDLETON  
CUMULATIVE SOUTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
POTENTIAL LNG TERMINAL SITE  
ANNUAL SUMMARY

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	20.38	15.06	4.70	1.49
0.5-1.0	.00	.00	.00	.00	10.94	9.16	2.48	.73
1.0-1.5	.00	.00	.00	.00	.74	1.49	.89	.33
1.5-2.0	.00	.00	.00	.00	.02	.13	.20	.09
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	32.08	25.84	8.26	2.64
								68.82

CAMP PENDLETON  
CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-5	5-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	39.01	40.90	17.24	4.34
0.5-1.0	.00	.00	.00	.00	16.79	19.78	8.45	1.68
1.0-1.5	.00	.00	.00	.00	1.15	3.01	1.69	.48
1.5-2.0	.00	.00	.00	.00	.05	.22	.13	.39
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	57.00	63.90	27.50	6.50
								154.90

CAMP PENDLETON  
CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	29.45	33.03	11.13	3.45
0.5-1.0	.00	.00	.00	.00	7.45	17.19	4.07	.76
1.0-1.5	.00	.00	.00	.00	.20	1.97	.90	.09
1.5-2.0	.00	.00	.00	.00	.00	.00	.10	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	37.10	52.20	16.20	4.30
								109.80



CAMP PENDLETON  
CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0.0-0.5	.00	.00	.00	.00	50.06	23.70	6.02	6.15	86.72
0.5-1.0	.00	.00	.00	.00	38.14	25.25	3.14	4.20	70.73
1.0-1.5	.00	.00	.00	.00	2.34	6.35	1.71	1.87	12.26
1.5-2.0	.00	.00	.00	.00	.06	.70	.43	.49	1.69
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	91.40	56.00	11.30	12.70	171.40

# CAMP PENDLETON

## CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0.0-0.5	.00	.00	.00	.00	37.38	33.72	6.67	1.11	78.89
0.5-1.0	.00	.00	.00	.00	24.79	21.51	4.79	.47	51.57
1.0-1.5	.00	.00	.00	.00	2.79	2.69	2.85	.21	8.54
1.5-2.0	.00	.00	.00	.00	.14	.28	.99	.11	1.51
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	65.10	58.20	15.30	1.90	140.50

CAMP PENDLETON  
CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	47.21	33.82	10.82	2.68
0.5-1.0	.00	.00	.00	.00	23.12	17.95	7.54	1.50
1.0-1.5	.00	.00	.00	.00	2.11	2.98	2.87	1.11
1.5-2.0	.00	.00	.00	.00	.06	.35	.58	.41
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	72.50	55.10	21.80	5.70
								155.10



CAMP PENDLETON

CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
POTENTIAL LNG TERMINAL SITE

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	40.64	15.53	4.53	.10
0.5-1.0	.00	.00	.00	.00	21.00	8.17	1.72	.16
1.0-1.5	.00	.00	.00	.00	.26	.94	.60	.24
1.5-2.0	.00	.00	.00	.00	.00	.06	.15	.10
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	61.90	24.70	7.00	.60
								94.20

CAMP PENDLETON  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 200

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	9.74	.00	.00	.00
0.5-1.0	.00	.00	.00	.00	2.74	.00	.00	.00
1.0-1.5	.00	.00	.00	.00	.02	.00	.00	.00
1.5-2.0	.00	.00	.00	.00	.00	.00	.00	.00
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	12.51	.00	.00	.00
								12.51

CAMP PENDLETON  
 CUMULATIVE SOUTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION - 210

HEIGHT (M)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0.0-0.5	.00	.00	.00	.00	7.91	12.76	3.83	.76	25.26
0.5-1.0	.00	.00	.00	.00	5.67	7.26	1.13	.22	14.29
1.0-1.5	.00	.00	.00	.00	.38	1.05	.13	.03	1.60
1.5-2.0	.00	.00	.00	.00	.01	.11	.00	.00	.12
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	13.97	21.17	5.09	1.02	41.26



CAMP PENDLETON  
 CUMULATIVE SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 220

HEIGHT (M)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0.0-0.5	.00	.00	.00	.00	2.72	2.30	.87	.73
0.5-1.0	.00	.00	.00	.00	2.52	1.90	1.34	.51
1.0-1.5	.00	.00	.00	.00	.33	.44	.76	.30
1.5-2.0	.00	.00	.00	.00	.02	.03	.19	.09
2.0-2.5	.00	.00	.00	.00	.00	.00	.00	.00
2.5-3.0	.00	.00	.00	.00	.00	.00	.00	.00
3.0-3.5	.00	.00	.00	.00	.00	.00	.00	.00
3.5-4.0	.00	.00	.00	.00	.00	.00	.00	.00
4.0-4.5	.00	.00	.00	.00	.00	.00	.00	.00
4.5-5.0	.00	.00	.00	.00	.00	.00	.00	.00
5.0-5.5	.00	.00	.00	.00	.00	.00	.00	.00
5.5-6.0	.00	.00	.00	.00	.00	.00	.00	.00
6.0-6.5	.00	.00	.00	.00	.00	.00	.00	.00
6.5-7.0	.00	.00	.00	.00	.00	.00	.00	.00
>7.0	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	5.60	4.67	3.17	1.62
								15.06

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	4.28	.00	.00	.00	.00	.00	.00	.00	4.28
2-3	8.47	.11	.00	.00	.00	.00	.00	.00	8.58
3-4	6.23	4.17	.00	.00	.00	.00	.00	.00	10.41
4-5	6.07	8.63	.00	.00	.00	.00	.00	.00	14.71
5-6	.52	5.88	.00	.00	.00	.00	.00	.00	6.41
6-7	.02	4.34	.70	.00	.00	.00	.00	.00	5.07
7-9	.00	.49	3.07	.00	.00	.00	.00	.00	3.56
9-11	.00	.00	.88	.09	.00	.00	.00	.00	.97
11-13	.00	.00	.19	.05	.00	.00	.00	.00	.24
13-15	.00	.00	.00	.05	.00	.00	.00	.00	.05
15-17	.00	.00	.05	.00	.00	.00	.00	.00	.05
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	25.62	23.63	4.89	.19	.00	.00	.00	.00	54.33

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	3.30	.00	.00	.00	.00	.00	.00	.00	3.30
2-3	7.00	.00	.00	.00	.00	.00	.00	.00	7.00
3-4	2.20	6.40	.00	.00	.00	.00	.00	.00	8.60
4-5	2.40	13.80	.00	.00	.00	.00	.00	.00	16.20
5-6	.00	7.10	.00	.00	.00	.00	.00	.00	7.10
6-7	.00	3.40	.00	.00	.00	.00	.00	.00	3.40
7-9	.00	1.10	3.20	.00	.00	.00	.00	.00	4.30
9-11	.00	.00	1.70	.00	.00	.00	.00	.00	1.70
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	14.90	31.80	4.90	.00	.00	.00	.00	.00	51.60



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	3.50	.00	.00	.00	.00	.00	.00	.00	3.50
2-3	6.90	.50	.00	.00	.00	.00	.00	.00	7.40
3-4	4.60	5.00	.00	.00	.00	.00	.00	.00	10.40
4-5	4.40	11.20	.00	.00	.00	.00	.00	.00	15.60
5-6	.00	7.00	.00	.00	.00	.00	.00	.00	7.00
6-7	.00	5.00	.30	.00	.00	.00	.00	.00	5.30
7-9	.00	1.20	4.50	.00	.00	.00	.00	.00	5.70
9-11	.00	.00	2.30	.00	.00	.00	.00	.00	2.30
11-13	.00	.00	1.20	.60	.00	.00	.00	.00	1.80
13-15	.00	.00	.00	.60	.00	.00	.00	.00	.60
15-17	.00	.00	.60	.00	.00	.00	.00	.00	.60
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	19.40	30.70	8.90	1.20	.00	.00	.00	.00	60.20

EAST CHANNEL SHELF  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	4.10	.00	.00	.00	.00	.00	.00	4.10
2-3	8.70	.00	.00	.00	.00	.00	.00	8.70
3-4	6.70	5.00	.00	.00	.00	.00	.00	11.70
4-5	8.30	9.30	.00	.00	.00	.00	.00	17.60
5-6	3.80	7.60	.00	.00	.00	.00	.00	11.40
6-7	.00	7.30	.30	.00	.00	.00	.00	7.60
7-9	.00	.30	5.30	.00	.00	.00	.00	5.60
9-11	.00	.00	2.40	.00	.00	.00	.00	2.40
11-13	.00	.00	.50	.00	.00	.00	.00	.50
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	31.60	29.50	8.50	.00	.00	.00	.00	69.60

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	3.30	.00	.00	.00	.00	.00	.00	3.30
2-3	6.50	.20	.00	.00	.00	.00	.00	6.70
3-4	5.50	4.90	.00	.00	.00	.00	.00	10.40
4-5	5.90	10.70	.00	.00	.00	.00	.00	16.60
5-6	2.50	9.50	.00	.00	.00	.00	.00	12.00
6-7	.30	7.40	.60	.00	.00	.00	.00	8.30
7-9	.00	.30	6.40	.00	.00	.00	.00	6.70
9-11	.00	.00	3.00	.00	.00	.00	.00	3.00
11-13	.00	.00	.60	.00	.00	.00	.00	.60
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	24.00	33.00	10.60	.00	.00	.00	.00	67.60



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	5.20	.00	.00	.00	.00	.00	.00	5.20
2-3	9.90	.30	.00	.00	.00	.00	.00	10.20
3-4	6.10	3.00	.00	.00	.00	.00	.00	9.90
4-5	4.00	7.50	.00	.00	.00	.00	.00	12.30
5-6	.00	5.40	.00	.00	.00	.00	.00	5.40
6-7	.00	2.50	2.20	.00	.00	.00	.00	4.70
7-9	.00	.00	5.10	.00	.00	.00	.00	5.10
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	26.00	19.50	7.30	.00	.00	.00	.00	53.60

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	3.60	.00	.00	.00	.00	.00	.00	3.60
2-3	6.60	.00	.00	.00	.00	.00	.00	6.60
3-4	10.90	3.90	.00	.00	.00	.00	.00	14.80
4-5	16.90	8.30	.00	.00	.00	.00	.00	25.20
5-6	.00	5.10	.00	.00	.00	.00	.00	5.10
6-7	.00	6.70	1.40	.00	.00	.00	.00	8.10
7-9	.00	.00	3.30	.00	.00	.00	.00	3.30
9-11	.00	.00	.00	.30	.00	.00	.00	.30
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	38.00	24.00	4.70	.30	.00	.00	.00	67.00

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	PERIOD (SEC)				16-18	>18	TOTAL
				10-12	12-14	14-16				
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	5.00	.00	.00	.00	.00	.00	.00	.00	.00	5.00
2-3	10.90	.00	.00	.00	.00	.00	.00	.00	.00	10.90
3-4	8.10	4.20	.00	.00	.00	.00	.00	.00	.00	12.30
4-5	7.30	8.60	.00	.00	.00	.00	.00	.00	.00	15.90
5-6	.00	6.20	.00	.00	.00	.00	.00	.00	.00	6.20
6-7	.00	4.60	1.60	.00	.00	.00	.00	.00	.00	6.20
7-9	.00	.30	.30	.00	.00	.00	.00	.00	.00	.60
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	32.10	23.90	1.90	.00	.00	.00	.00	.00	.00	57.90



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	4.50	.00	.00	.00	.00	.00	.00	4.50
2-3	9.70	.00	.00	.00	.00	.00	.00	9.70
3-4	5.70	4.30	.00	.00	.00	.00	.00	10.00
4-5	3.40	9.00	.00	.00	.00	.00	.00	12.40
5-6	.00	5.10	.00	.00	.00	.00	.00	5.10
6-7	.00	2.50	.30	.00	.00	.00	.00	2.80
7-9	.00	.80	.50	.00	.00	.00	.00	1.30
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	23.30	21.70	.80	.00	.00	.00	.00	45.80

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	4.10	.00	.00	.00	.00	.00	.00	4.10
2-3	8.30	.00	.00	.00	.00	.00	.00	8.30
3-4	7.00	4.50	.00	.00	.00	.00	.00	11.50
4-5	7.60	9.00	.00	.00	.00	.00	.00	17.40
5-6	.00	5.70	.00	.00	.00	.00	.00	5.70
6-7	.00	2.20	.30	.00	.00	.00	.00	2.50
7-9	.00	.00	1.40	.00	.00	.00	.00	1.40
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	27.00	22.20	1.70	.00	.00	.00	.00	50.90

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	7.20	.00	.00	.00	.00	.00	.00	.00	7.20
2-3	14.30	.00	.00	.00	.00	.00	.00	.00	14.30
3-4	7.50	3.10	.00	.00	.00	.00	.00	.00	10.60
4-5	2.70	6.00	.00	.00	.00	.00	.00	.00	8.70
5-6	.00	5.00	.00	.00	.00	.00	.00	.00	5.00
6-7	.00	4.10	.50	.00	.00	.00	.00	.00	4.60
7-9	.00	.60	2.40	.00	.00	.00	.00	.00	3.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	31.70	10.00	2.90	.00	.00	.00	.00	.00	53.40



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.00	.00	.00	.00	.00	.00	.00	.00	2.00
2-3	5.70	.00	.00	.00	.00	.00	.00	.00	5.70
3-4	4.00	2.20	.00	.00	.00	.00	.00	.00	7.00
4-5	4.40	4.00	.00	.00	.00	.00	.00	.00	9.20
5-6	.00	3.30	.00	.00	.00	.00	.00	.00	3.30
6-7	.00	3.10	.60	.00	.00	.00	.00	.00	3.70
7-9	.00	1.00	2.20	.00	.00	.00	.00	.00	3.20
9-11	.00	.00	.60	.00	.00	.00	.00	.00	.60
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.70	14.40	3.40	.00	.00	.00	.00	.00	35.50

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	4.00	.00	.00	.00	.00	.00	.00	.00	4.00
2-3	7.20	.30	.00	.00	.00	.00	.00	.00	7.50
3-4	5.70	2.00	.00	.00	.00	.00	.00	.00	7.70
4-5	4.80	4.60	.00	.00	.00	.00	.00	.00	9.40
5-6	.00	3.60	.00	.00	.00	.00	.00	.00	3.60
6-7	.00	3.30	.30	.00	.00	.00	.00	.00	3.60
7-9	.00	.30	2.20	.00	.00	.00	.00	.00	2.50
9-11	.00	.00	.60	.00	.00	.00	.00	.00	.60
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	21.70	14.10	3.10	.00	.00	.00	.00	.00	38.90

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 360.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.02	.00	.00	.00	.00	.00	.00	.02
2-3	.04	.02	.00	.00	.00	.00	.00	.07
3-4	.00	.10	.00	.00	.00	.00	.00	.10
4-5	.05	.19	.00	.00	.00	.00	.00	.24
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.05	.00	.00	.00	.00	.00	.05
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.12	.37	.00	.00	.00	.00	.00	.49



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 45.00

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.02	.00	.00	.00	.00	.00	.00	.00	.02
3-4	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.02	.00	.00	.00	.00	.00	.00	.02
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.02	.02	.00	.00	.00	.00	.00	.00	.05

EAST CHANNEL SHELF  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE  
WAVE DIRECTION = 135.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.52	.00	.00	.00	.00	.00	.00	.52
2-3	.93	.84	.00	.00	.00	.00	.00	.97
3-4	.42	.33	.00	.00	.00	.00	.00	.75
4-5	.19	.78	.00	.00	.00	.00	.00	.97
5-6	.00	.44	.00	.00	.00	.00	.00	.44
6-7	.00	.26	.07	.00	.00	.00	.00	.32
7-9	.00	.12	.79	.00	.00	.00	.00	.92
9-11	.00	.00	.42	.00	.00	.00	.00	.42
11-13	.00	.00	.14	.05	.00	.00	.00	.19
13-15	.00	.00	.00	.05	.00	.00	.00	.05
15-17	.00	.00	.05	.00	.00	.00	.00	.05
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	2.07	1.98	1.47	.10	.00	.00	.00	5.62

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 157.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.04	.00	.00	.00	.00	.04
9-11	.00	.00	.02	.00	.00	.00	.00	.02
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.07	.00	.00	.00	.00	.07



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 180.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.03	.00	.00	.00	.00	.00	.00	.03
2-3	.08	.00	.00	.00	.00	.00	.00	.08
3-4	.00	.04	.00	.00	.00	.00	.00	.04
4-5	.00	.07	.00	.00	.00	.00	.00	.07
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.12	.11	.00	.00	.00	.00	.00	.22

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 202.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.00	.00	.00	.00	.00	.00	.00	.00
3-4	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.02	.00	.00	.00	.00	.00	.00	.02
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.02	.00	.00	.00	.00	.00	.00	.02

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 225.00

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.31	.00	.00	.00	.00	.00	.00	.00	.31
2-3	.42	.00	.00	.00	.00	.00	.00	.00	.42
3-4	.00	.02	.00	.00	.00	.00	.00	.00	.02
4-5	.00	.02	.00	.00	.00	.00	.00	.00	.02
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.72	.05	.00	.00	.00	.00	.00	.00	.77



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 247.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-19	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.12	.00	.00	.00	.00	.00	.00	.12
2-3	.26	.00	.00	.00	.00	.00	.00	.26
3-4	.03	.02	.00	.00	.00	.00	.00	.06
4-5	.10	.12	.00	.00	.00	.00	.00	.22
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.02	.00	.00	.00	.00	.00	.02
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.51	.17	.00	.00	.00	.00	.00	.68

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 270.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.57	.00	.00	.00	.00	.00	.00	1.57
2-3	3.24	.04	.00	.00	.00	.00	.00	3.28
3-4	1.60	.97	.00	.00	.00	.00	.00	2.57
4-5	.43	2.02	.00	.00	.00	.00	.00	2.45
5-6	.00	1.25	.00	.00	.00	.00	.00	1.25
6-7	.00	.58	.29	.00	.00	.00	.00	.87
7-9	.00	.07	1.05	.00	.00	.00	.00	1.12
9-11	.00	.00	.39	.02	.00	.00	.00	.42
11-13	.00	.00	.02	.00	.00	.00	.00	.02
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	6.84	4.93	1.76	.02	.00	.00	.00	13.56

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 292.50

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.55	.00	.00	.00	.00	.00	.00	.00	.55
2-3	1.07	.00	.00	.00	.00	.00	.00	.00	1.07
3-4	1.12	1.07	.00	.00	.00	.00	.00	.00	2.19
4-5	1.22	2.12	.00	.00	.00	.00	.00	.00	3.34
5-6	.17	1.59	.00	.00	.00	.00	.00	.00	1.77
6-7	.00	1.01	.34	.00	.00	.00	.00	.00	1.35
7-9	.00	.07	1.10	.00	.00	.00	.00	.00	1.26
9-11	.00	.00	.05	.07	.00	.00	.00	.00	.12
11-13	.00	.00	.02	.00	.00	.00	.00	.00	.02
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	4.14	5.07	1.60	.07	.00	.00	.00	.00	11.67



EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 315.00

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.13	.00	.00	.00	.00	.00	.00	.00	1.13
2-3	2.32	.00	.00	.00	.00	.00	.00	.00	2.32
3-4	3.03	1.61	.00	.00	.00	.00	.00	.00	4.64
4-5	3.96	3.22	.00	.00	.00	.00	.00	.00	7.18
5-6	.35	2.60	.00	.00	.00	.00	.00	.00	2.95
6-7	.02	2.42	.00	.00	.00	.00	.00	.00	2.44
7-9	.00	.22	.00	.00	.00	.00	.00	.00	.22
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	10.02	10.07	.00	.00	.00	.00	.00	.00	20.90

EAST CHANNEL SHELF  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 337.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.02	.00	.00	.00	.00	.00	.00	.02
2-3	.07	.00	.00	.00	.00	.00	.00	.07
3-4	.02	.00	.00	.00	.00	.00	.00	.02
4-5	.10	.05	.00	.00	.00	.00	.00	.15
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.22	.05	.00	.00	.00	.00	.00	.27

# EAST CHANNEL SHELF

## CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

### POTENTIAL LNG TERMINAL SITE ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.13	.01	.01	.00	.01
1-2	.00	.27	14.60	13.32	.32	.35	.21	.05
2-3	.00	.94	13.86	9.18	1.85	1.84	.43	.05
3-4	.00	.43	11.33	2.17	.80	.47	.21	.01
4-5	.00	.17	8.52	1.86	.63	.30	.12	.00
5-6	.00	.00	3.30	1.57	.35	.23	.11	.00
6-7	.00	.02	1.31	1.82	.32	.10	.03	.00
7-9	.00	.00	.63	1.64	.60	.13	.08	.00
9-11	.00	.00	.09	.79	.20	.09	.02	.00
11-13	.00	.00	.05	.25	.08	.07	.00	.00
13-15	.00	.00	.02	.14	.09	.06	.00	.00
15-17	.00	.00	.00	.85	.03	.01	.00	.00
17-19	.00	.00	.00	.00	.02	.02	.00	.00
Total								97.99



EAST CHANNEL SHELF  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	.00	.06	.00	.00	.00	.00	.06
1-2	.00	1.00	4.30	6.09	.15	.53	.28	.15	12.51
2-3	.00	3.30	7.60	7.56	1.92	2.03	.68	.15	23.25
3-4	.00	1.60	10.20	3.85	2.32	.47	.14	.00	18.58
4-5	.00	.50	8.90	4.00	2.33	.33	.44	.00	16.51
5-6	.00	.00	2.90	3.15	1.34	.67	.36	.00	8.41
6-7	.00	.00	1.60	1.75	.46	.38	.00	.00	4.20
7-9	.00	.00	.30	1.77	1.46	.33	.00	.00	3.87
9-11	.00	.00	.00	.81	.41	.15	.00	.00	1.36
11-13	.00	.00	.00	.76	.00	.22	.00	.00	.97
13-15	.00	.00	.00	.02	.00	.33	.00	.00	.36
15-17	.00	.00	.00	.28	.00	.05	.00	.00	.33
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.40	35.80	30.10	10.40	5.50	1.90	.30	90.40

EAST CHANNEL SHELF  
CUMULATIVE NORTH SLELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.12	.00	.00	.05	.00	.18
1-2	.00	1.00	5.00	12.17	.23	.58	.56	.00	20.35
2-3	.00	1.90	4.00	9.56	2.78	2.69	.58	.00	22.32
3-4	.00	1.40	8.10	2.10	1.87	1.82	.78	.00	16.07
4-5	.00	.90	4.90	4.86	2.27	1.72	.59	.00	14.44
5-6	.00	.00	4.00	4.19	1.62	1.49	.64	.00	11.93
6-7	.00	.00	2.00	1.72	1.41	.30	.00	.00	5.43
7-9	.00	.00	4.30	3.42	3.47	.00	.24	.00	11.43
9-11	.00	.00	.30	3.01	.24	.18	.06	.00	3.80
11-13	.00	.00	.60	.92	.38	.33	.00	.00	2.23
13-15	.00	.00	.00	1.03	1.02	.08	.00	.00	2.13
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.00	34.00	42.30	15.30	9.20	3.50	.00	110.30

EAST CHANNEL SHELF  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.04	.00	.00	.00	.04
1-2	.00	.00	6.90	3.69	.33	.40	.28	11.61
2-3	.00	1.30	23.20	6.35	3.77	1.57	.68	36.86
3-4	.00	.00	16.90	2.74	.83	.56	.35	22.18
4-5	.00	.30	6.70	2.92	.77	.44	.09	11.22
5-6	.00	.00	6.70	2.70	.60	.13	.01	10.13
6-7	.00	.00	1.80	2.15	.60	.19	.18	4.92
7-9	.00	.00	.80	2.40	.15	.46	.11	3.92
9-11	.00	.00	.80	1.72	.65	.15	.00	3.32
11-13	.00	.00	.00	.02	.00	.22	.00	.24
13-15	.00	.00	.30	.28	.09	.08	.00	.76
15-17	.00	.00	.00	.00	.21	.00	.00	.21
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.40	64.10	25.00	8.00	4.20	1.70	105.40



EAST CHANNEL SHELF  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.09	.07	.12	.00	.00	.28
1-2	.00	.00	13.10	8.97	1.79	1.22	.28	.00	25.36
2-3	.00	.00	16.78	7.73	1.88	1.12	.68	.00	28.91
3-4	.00	1.18	11.48	2.79	1.01	.67	.14	.00	17.11
4-5	.00	.30	9.20	1.88	.25	.33	.00	.00	11.96
5-6	.00	.00	3.60	1.09	.00	.13	.01	.00	4.84
6-7	.00	.30	2.50	.87	.04	.00	.18	.00	3.89
7-9	.00	.00	1.10	3.27	.41	.15	.59	.00	5.52
9-11	.00	.00	.00	1.86	.83	.33	.12	.00	3.15
11-13	.00	.00	.00	.78	.62	.12	.00	.00	1.51
13-15	.00	.00	.00	.30	.00	.25	.00	.00	.55
15-17	.00	.00	.00	.28	.11	.05	.00	.00	.43
17-19	.00	.00	.00	.00	.19	.30	.00	.00	.49
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.50	57.60	29.90	7.20	4.80	2.00	.00	104.00

EAST CHANNEL SHELVE  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.12	.00	.00	.00	.12
1-2	.00	.00	16.00	12.34	.23	.18	.39	29.93
2-3	.00	.50	15.50	17.78	2.47	.89	.71	37.86
3-4	.00	.30	15.10	1.64	.13	.67	.00	17.84
4-5	.00	.00	7.30	2.13	.67	.17	.00	10.26
5-6	.00	.00	4.00	.55	.00	.20	.00	5.55
6-7	.00	.00	1.60	4.05	.00	.10	.00	5.75
7-9	.00	.00	.00	.31	.00	.00	.00	.31
9-11	.00	.00	.00	.48	.00	.00	.00	.48
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.80	61.10	39.40	3.50	2.20	1.10	108.10

EAST CHANNEL SHELF  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	.00	.01	.00	.00	.00	.01
1-2	.00	.00	14.00	1.06	.00	.00	.00	15.06
2-3	.00	.00	19.90	3.42	.00	.00	.00	23.32
3-4	.00	.00	16.40	2.74	.00	.00	.00	19.14
4-5	.00	.00	19.20	.67	.00	.00	.00	19.87
5-6	.00	.00	7.00	2.09	.00	.00	.00	9.09
6-7	.00	.00	1.90	4.57	.00	.00	.00	6.47
7-9	.00	.00	.30	4.31	.00	.00	.00	4.61
9-11	.00	.00	.00	1.34	.00	.00	.00	1.34
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	78.70	20.20	.00	.00	.00	98.90



EAST CHANNEL SHELF  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.21	.00	.00	.00	.21
1-2	.00	.00	32.50	20.42	.00	.00	.00	52.92
2-3	.00	.00	12.20	5.98	.00	.00	.00	18.18
3-4	.00	.00	8.30	.01	.00	.00	.00	8.31
4-5	.00	.00	9.10	.35	.00	.00	.00	9.45
5-6	.00	.00	4.00	1.34	.00	.00	.00	5.34
6-7	.00	.00	.00	1.70	.00	.00	.00	1.70
7-9	.00	.00	.00	.29	.00	.00	.00	.29
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	66.10	30.30	.00	.00	.00	96.40

EAST CHANNEL SHELF  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.22	.00	.00	.00	.22
1-2	.00	.00	16.00	22.21	.07	.00	.00	38.27
2-3	.00	.00	13.80	11.17	.73	.00	.00	25.70
3-4	.00	.00	11.60	.04	.00	.00	.00	11.64
4-5	.00	.00	16.90	1.06	.00	.00	.00	17.96
5-6	.00	.00	1.10	.07	.00	.00	.00	1.17
6-7	.00	.00	1.10	1.05	.00	.00	.00	2.15
7-9	.00	.00	.00	.48	.00	.00	.00	.48
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	60.50	36.30	.80	.00	.00	97.60

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ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 13/10  
PRELIMINARY EVALUATION OF WIND AND WAVE EFFECTS AT POTENTIAL LN--ETC(U)  
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EAST CHANNEL SHELF  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.21	.00	.00	.00	.21
1-2	.00	.00	26.60	20.86	.16	.13	.11	47.86
2-3	.00	1.10	10.40	13.15	1.84	.47	.19	27.15
3-4	.00	.00	1.50	.59	.70	.00	.00	2.79
4-5	.00	.00	3.30	.29	.00	.00	.00	3.59
5-6	.00	.00	.80	.04	.00	.00	.00	.84
6-7	.00	.00	.00	.56	.00	.00	.00	.56
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.10	42.60	35.70	2.70	.60	.30	83.00

EAST CHANNEL SHELF  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.24	.00	.00	.00	.24
1-2	.00	.00	18.00	23.97	.07	.07	.28	43.19
2-3	.00	.00	13.20	10.48	.73	.23	.52	25.17
3-4	.00	.00	11.00	.84	.00	.13	.21	11.39
4-5	.00	.00	9.70	1.11	.06	.17	.09	11.13
5-6	.00	.00	2.20	1.11	.24	.00	.30	3.85
6-7	.00	.00	1.80	1.07	.00	.12	.00	2.99
7-9	.00	.00	.30	1.06	.00	.18	.00	1.54
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	57.00	39.10	1.10	.90	1.40	99.50

EAST CHANNEL SHELF  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.19	.00	.00	.00	.19
1-2	.00	.00	8.90	18.95	.28	.31	.21	28.65
2-3	.00	.00	14.20	6.89	3.16	1.19	.39	25.83
3-4	.00	.00	13.90	4.19	1.01	.20	.00	19.30
4-5	.00	.00	3.60	2.70	.25	.00	.00	6.55
5-6	.00	.00	1.40	.33	.00	.00	.00	1.73
6-7	.00	.00	.60	.82	.16	.00	.00	1.58
7-9	.00	.00	.00	1.83	.94	.00	.00	2.77
9-11	.00	.00	.00	.03	.00	.00	.00	.83
11-13	.00	.00	.00	.57	.00	.00	.00	.57
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	42.60	36.50	5.80	1.70	.60	87.20



EAST CHANNEL SHELF  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.09	.01	.03	.00	.07
1-2	.00	.50	12.30	9.11	.53	.00	.10	.47
2-3	.00	2.40	14.00	10.06	2.00	2.30	.75	.47
3-4	.00	.00	11.60	5.28	1.76	1.09	.94	.00
4-5	.00	.00	3.50	1.17	.92	.44	.24	.00
5-6	.00	.00	1.10	2.19	.35	.13	.00	.00
6-7	.00	.00	.00	1.52	1.17	.12	.00	.00
7-9	.00	.00	.50	.50	.74	.43	.00	.00
9-11	.00	.00	.00	.29	.24	.25	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.90	44.60	30.20	8.60	5.60	2.10	1.10
								95.10

EAST CHANNEL SHELF  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 270.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.13	.01	.01	.00	.01
1-2	.00	.27	14.60	13.32	.32	.35	.21	.05
2-3	.00	.94	13.86	9.18	1.85	1.04	.43	.05
3-4	.00	.43	11.33	2.17	.00	.47	.21	.01
4-5	.00	.17	8.52	1.86	.63	.30	.12	.00
5-6	.00	.00	3.30	1.57	.35	.23	.11	.00
6-7	.00	.02	1.31	1.82	.32	.10	.03	.00
7-9	.00	.00	.63	1.64	.60	.13	.00	.00
9-11	.00	.00	.09	.79	.20	.09	.02	.00
11-13	.00	.00	.05	.25	.08	.07	.00	.00
13-15	.00	.00	.02	.14	.09	.06	.00	.00
15-17	.00	.00	.00	.05	.03	.01	.00	.00
17-19	.00	.00	.00	.00	.02	.02	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.84	53.72	32.92	5.20	2.89	1.22	.12
								97.99

CHINESE HARBOR  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE  
ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.73	.00	.00	.00	.00	.00	.00	1.73
2-3	3.54	.11	.00	.00	.00	.00	.00	3.65
3-4	4.10	2.92	.00	.00	.00	.00	.00	7.11
4-5	5.32	5.59	.43	.00	.00	.00	.00	11.35
5-6	.52	4.19	.85	.04	.00	.00	.00	5.61
6-7	.02	3.27	.28	.02	.00	.00	.00	3.60
7-9	.00	.29	.05	.00	.00	.00	.00	.34
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	15.33	16.38	1.60	.87	.88	.88	.88	33.38



CHINESE HARBOR  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.30	.00	.00	.00	.00	.00	.00	1.30
2-3	2.00	.09	.00	.00	.00	.00	.00	2.09
3-4	1.90	3.34	.00	.00	.00	.00	.00	5.24
4-5	1.50	6.25	.02	.00	.00	.00	.00	7.77
5-6	.00	3.64	.21	.00	.00	.00	.00	3.85
6-7	.00	2.00	.06	.00	.00	.00	.00	2.07
7-9	.00	.77	.00	.00	.00	.00	.00	.77
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	7.50	16.10	.30	.00	.00	.00	.00	23.90

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.30	.00	.00	.00	.00	.00	.00	1.30
2-3	2.00	.10	.00	.00	.00	.00	.00	2.90
3-4	2.00	3.37	.00	.00	.00	.00	.00	6.17
4-5	3.50	6.67	.38	.00	.00	.00	.00	10.55
5-6	.00	4.81	.79	.00	.00	.00	.00	5.59
6-7	.00	3.87	.39	.00	.00	.00	.00	4.26
7-9	.00	.58	.43	.00	.00	.00	.00	1.01
9-11	.00	.00	.02	.00	.00	.00	.00	.02
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	10.40	19.40	2.00	.00	.00	.00	.00	31.80

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	9-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.20	.00	.00	.00	.00	.00	.00	1.20
2-3	2.80	.11	.00	.00	.00	.00	.00	2.91
3-4	5.30	3.64	.00	.00	.00	.00	.00	8.94
4-5	8.10	6.23	.43	.00	.00	.00	.00	14.76
5-6	3.80	5.68	1.29	.00	.00	.00	.00	10.77
6-7	.00	5.64	.39	.00	.00	.00	.00	6.02
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	21.20	21.30	2.10	.00	.00	.00	.00	44.60



CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.50	.00	.00	.00	.00	.00	.00	1.50
2-3	3.00	.09	.00	.00	.00	.00	.00	3.09
3-4	3.60	3.26	.00	.00	.00	.00	.00	6.86
4-5	5.10	6.46	.12	.00	.00	.00	.00	11.68
5-6	2.50	6.30	1.21	.00	.00	.00	.00	10.02
6-7	.30	4.99	.36	.00	.00	.00	.00	5.65
7-9	.00	.29	.00	.00	.00	.00	.00	.29
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	16.00	21.40	1.70	.00	.00	.00	.00	39.10

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.90	.00	.00	.00	.00	.00	.00	.90
2-3	1.60	.07	.00	.00	.00	.00	.00	1.67
3-4	2.30	2.30	.00	.00	.00	.00	.00	4.60
4-5	3.80	4.13	1.69	.00	.00	.00	.00	9.61
5-6	.00	3.72	2.86	.34	.00	.00	.00	6.92
6-7	.00	1.78	.86	.16	.00	.00	.00	2.81
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	8.60	12.00	5.40	.50	.00	.00	.00	26.50

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.10	.00	.00	.00	.00	.00	.00	2.10
2-3	3.90	.10	.00	.00	.00	.00	.00	4.00
3-4	9.90	3.47	.00	.00	.00	.00	.00	13.37
4-5	16.00	6.65	.90	.00	.00	.00	.00	23.55
5-6	.00	4.57	1.00	.20	.00	.00	.00	5.77
6-7	.00	6.11	.30	.10	.00	.00	.00	6.50
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	31.90	20.90	2.20	.30	.00	.00	.00	55.30



CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.70	.00	.00	.00	.00	.00	.00	2.70
2-3	5.70	.09	.00	.00	.00	.00	.00	5.79
3-4	5.70	3.15	.00	.00	.00	.00	.00	8.85
4-5	5.80	5.80	.52	.00	.00	.00	.00	12.21
5-6	.00	4.38	.21	.00	.00	.00	.00	4.59
6-7	.00	3.11	.06	.00	.00	.00	.00	3.17
7-9	.00	.29	.00	.00	.00	.00	.00	.29
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	19.90	16.90	.80	.00	.00	.00	.00	37.60

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.00	.00	.00	.00	.00	.00	.00	.00	2.00
2-3	5.00	.10	.00	.00	.00	.00	.00	.00	5.10
3-4	3.10	3.37	.00	.00	.00	.00	.00	.00	6.47
4-5	2.50	6.52	.00	.00	.00	.00	.00	.00	9.02
5-6	.00	3.63	.00	.00	.00	.00	.00	.00	3.63
6-7	.00	1.90	.00	.00	.00	.00	.00	.00	1.90
7-9	.00	.48	.00	.00	.00	.00	.00	.00	.48
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	12.60	16.00	.00	.00	.00	.00	.00	.00	28.60

CHINESE HARBOR

CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.10	.00	.00	.00	.00	.00	.00	2.10
2-3	4.50	.12	.00	.00	.00	.00	.00	4.62
3-4	5.80	4.01	.00	.00	.00	.00	.00	9.81
4-5	7.40	7.92	.00	.00	.00	.00	.00	15.40
5-6	.00	4.77	.79	.00	.00	.00	.00	5.55
6-7	.00	1.78	.24	.00	.00	.00	.00	2.02
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	19.80	18.60	1.10	.00	.00	.00	.00	39.50



CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	PERIOD (SEC)				16-18	>18	TOTAL
				10-12	12-14	14-16				
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	2.40	.00	.00	.00	.00	.00	.00	.00	.00	2.40
2-3	3.90	.06	.00	.00	.00	.00	.00	.00	.00	3.96
3-4	3.20	2.11	.00	.00	.00	.00	.00	.00	.00	5.31
4-5	2.60	4.12	.58	.00	.00	.00	.00	.00	.00	7.29
5-6	.00	3.61	.79	.00	.00	.00	.00	.00	.00	4.39
6-7	.00	2.92	.24	.00	.00	.00	.00	.00	.00	3.16
7-9	.00	.29	.00	.00	.00	.00	.00	.00	.00	.29
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	12.10	13.10	1.60	.00	.00	.00	.00	.00	.00	26.80

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	PERIOD (SEC)				16-18	>18	TOTAL
				10-12	12-14	14-16				
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.40	.00	.00	.00	.00	.00	.00	.00	.00	1.40
2-3	3.00	.05	.00	.00	.00	.00	.00	.00	.00	3.05
3-4	2.90	1.68	.00	.00	.00	.00	.00	.00	.00	4.58
4-5	3.80	3.29	.38	.00	.00	.00	.00	.00	.00	7.47
5-6	.00	2.55	.79	.00	.00	.00	.00	.00	.00	3.34
6-7	.00	2.74	.39	.00	.00	.00	.00	.00	.00	3.13
7-9	.00	.48	.15	.00	.00	.00	.00	.00	.00	.63
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	11.10	10.80	1.70	.00	.00	.00	.00	.00	.00	23.60

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.90	.01	.00	.00	.00	.00	.00	.00	1.91
2-3	3.50	.33	.00	.00	.00	.00	.00	.00	3.83
3-4	3.70	1.38	.00	.00	.00	.00	.00	.00	5.08
4-5	3.80	3.01	.02	.00	.00	.00	.00	.00	6.83
5-6	.00	2.63	.21	.00	.00	.00	.00	.00	2.84
6-7	.00	2.45	.06	.00	.00	.00	.00	.00	2.52
7-9	.00	.29	.00	.00	.00	.00	.00	.00	.29
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	12.90	10.10	.30	.00	.00	.00	.00	.00	23.30



CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = .00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.02	.00	.00	.00	.00	.00	.00	.03
2-3	.04	.03	.00	.00	.00	.00	.00	.07
3-4	.00	.10	.00	.00	.00	.00	.00	.10
4-5	.05	.18	.00	.00	.00	.00	.00	.23
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.05	.00	.00	.00	.00	.00	.05
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.12	.37	.00	.00	.00	.00	.00	.48

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 337.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.02	.00	.00	.00	.00	.00	.00	.02
2-3	.07	.00	.00	.00	.00	.00	.00	.07
3-4	.02	.00	.00	.00	.00	.00	.00	.03
4-5	.10	.05	.00	.00	.00	.00	.00	.15
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.22	.05	.00	.00	.00	.00	.00	.27

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 315.00

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	1.13	.00	.00	.00	.00	.00	.00	.00	1.13
2-3	2.32	.05	.00	.00	.00	.00	.00	.00	2.37
3-4	3.03	1.69	.00	.00	.00	.00	.00	.00	4.72
4-5	3.96	3.23	.00	.00	.00	.00	.00	.00	7.18
5-6	.35	2.62	.00	.00	.00	.00	.00	.00	2.97
6-7	.02	2.28	.00	.00	.00	.00	.00	.00	2.30
7-9	.00	.22	.00	.00	.00	.00	.00	.00	.22
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	10.82	10.07	.00	.00	.00	.00	.00	.00	20.90



CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 292.50

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.55	.00	.00	.00	.00	.00	.00	.00	.55
2-3	1.07	.03	.00	.00	.00	.00	.00	.00	1.11
3-4	1.12	1.12	.00	.00	.00	.00	.00	.00	2.25
4-5	1.22	2.12	.43	.00	.00	.00	.00	.00	3.76
5-6	.17	1.57	.85	.04	.00	.00	.00	.00	2.64
6-7	.00	.95	.28	.02	.00	.00	.00	.00	1.25
7-9	.00	.07	.05	.00	.00	.00	.00	.00	.12
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	4.14	5.87	1.60	.07	.00	.00	.00	.00	11.67

CHINESE HARBOR  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 45.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	.00	.00	.00	.00	.00	.00	.00
2-3	.02	.00	.00	.00	.00	.00	.00	.02
3-4	.00	.01	.00	.00	.00	.00	.00	.01
4-5	.00	.02	.00	.00	.00	.00	.00	.02
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.02	.02	.00	.00	.00	.00	.00	.05

CHINESE HARBOR  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.73	3.49	.14	.11	.06	.05
1-2	.00	.33	17.72	16.01	2.68	2.39	1.33	.30
2-3	.00	2.70	18.14	8.61	2.53	1.36	.62	.07
3-4	.00	1.59	13.92	4.03	1.61	.72	.21	.00
4-5	.00	.41	8.18	3.32	1.11	.32	.05	.00
5-6	.00	.03	3.12	2.51	.77	.18	.07	.00
6-7	.00	.02	.99	1.46	.42	.18	.00	.00
7-9	.00	.00	.72	1.41	.28	.14	.00	.00
9-11	.00	.00	.13	.39	.17	.07	.00	.00
11-13	.00	.00	.07	.15	.07	.02	.00	.00
13-15	.00	.00	.01	.04	.01	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	5.00	64.73	41.42	9.79	5.43	2.33	.42
								129.22



CHINESE HARBOR  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.01	.48	1.90	.00	.00	.25	.00
1-2	.00	1.10	5.87	9.75	1.97	3.23	1.86	.30
2-3	.00	5.55	12.72	8.25	5.13	2.17	1.15	.00
3-4	.00	5.29	17.58	9.20	4.79	2.37	.74	.00
4-5	.00	1.26	12.22	7.55	3.01	1.83	.00	.00
5-6	.00	.28	5.87	4.00	1.93	.35	.00	.00
6-7	.00	.00	1.69	3.62	1.08	.15	.00	.00
7-9	.00	.00	.67	2.72	.50	.30	.00	.00
9-11	.00	.00	.00	.70	.00	.30	.00	.00
11-13	.00	.00	.00	.19	.00	.00	.00	.00
13-15	.00	.00	.00	.11	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	13.50	57.10	48.00	18.40	9.90	4.00	.30
								151.20

CHINESE HARBOR  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.02	.56	3.02	.00	.00	.49	.00
1-2	.00	1.84	5.58	14.07	2.40	4.27	1.99	.30
2-3	.00	2.86	7.43	6.95	3.54	3.53	2.35	.30
3-4	.00	3.65	10.62	6.65	5.07	3.20	.76	.00
4-5	.00	1.44	7.61	6.55	2.97	.30	.01	.00
5-6	.00	.00	3.93	3.68	3.86	.00	.27	.00
6-7	.00	.00	3.22	2.81	1.31	.10	.01	.00
7-9	.00	.00	4.30	4.37	.15	.50	.00	.00
9-11	.00	.00	.82	1.20	1.40	.00	.00	.00
11-13	.00	.00	.23	.69	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	9.80	44.30	50.00	20.70	11.90	5.90	.60
								143.20

CHINESE HARBOR  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.77	1.02	.13	.20	.00	2.12
1-2	.00	.10	12.18	7.62	4.54	3.33	2.19	30.27
2-3	.00	5.07	28.22	7.55	2.93	2.77	.81	47.35
3-4	.00	2.35	18.40	5.50	2.43	.60	.04	29.32
4-5	.00	.58	9.94	4.47	1.49	.33	.26	17.08
5-6	.00	.00	5.09	2.70	.21	.47	.00	8.47
6-7	.00	.00	1.13	1.69	.46	.30	.00	3.58
7-9	.00	.00	1.22	2.17	.40	.30	.00	4.10
9-11	.00	.00	.73	.49	.21	.00	.00	1.44
11-13	.00	.00	.33	.37	.62	.00	.00	1.33
13-15	.00	.00	.08	.26	.06	.00	.00	.41
15-17	.00	.00	.00	.04	.00	.00	.00	.04
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	8.10	78.10	33.90	13.50	8.30	3.30	145.50



CHINESE HARBOR  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	1.67	2.30	.86	.73	.00	.00	5.56
1-2	.00	.03	17.04	13.70	3.89	3.03	1.79	.00	39.49
2-3	.00	1.61	17.52	9.87	2.24	1.23	.11	.00	32.59
3-4	.00	1.38	13.64	2.92	.21	.30	.04	.00	18.51
4-5	.00	.58	8.50	1.30	.02	.20	.29	.00	10.88
5-6	.00	.02	4.29	1.42	.21	.25	.55	.00	6.74
6-7	.00	.28	1.77	2.06	.61	.35	.03	.00	5.11
7-9	.00	.00	1.16	3.09	1.29	.40	.00	.00	5.94
9-11	.00	.00	.00	1.45	.06	.60	.00	.00	2.11
11-13	.00	.00	.22	.56	.24	.30	.00	.00	1.31
13-15	.00	.00	.08	.11	.06	.00	.00	.00	.26
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	3.90	65.90	38.00	9.70	7.40	2.80	.00	128.50

CHINESE HARBOR  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.56	.52	.26	.00	.00	.00
1-2	.00	.01	17.84	3.82	.86	2.17	.00	.00
2-3	.00	.61	24.73	7.50	1.99	.53	.00	.00
3-4	.00	.58	20.20	2.65	.00	.00	.00	.00
4-5	.00	.00	14.56	3.07	.00	.00	.00	.00
5-6	.00	.00	4.38	4.62	.00	.00	.00	.00
6-7	.00	.00	.75	2.75	.00	.00	.00	.00
7-9	.00	.00	.18	1.95	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.20	84.20	26.90	3.10	2.70	.80	118.90

CHINESE HARBOR  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	9-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	2.11	3.62	.13	.00	.00	.00
1-2	.00	.09	21.78	20.57	3.43	1.57	1.10	.00
2-3	.00	4.45	22.88	12.25	2.07	.83	.30	.00
3-4	.00	1.36	15.49	3.55	.57	.20	.30	.00
4-5	.00	.00	7.78	1.80	.04	.43	.00	.00
5-6	.00	.00	3.53	3.80	.36	.17	.00	.00
6-7	.00	.00	.63	.50	.11	.00	.00	.00
7-9	.00	.00	.00	.60	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	5.90	74.20	46.70	6.70	3.20	1.70	.00
								138.40



CHINESE HARBOR  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	3.61	5.12	.00	.20	.00	.00
1-2	.00	.03	31.71	18.57	.26	.10	.00	.00
2-3	.00	1.57	12.81	3.42	.34	.00	.00	.00
3-4	.00	.00	10.04	.67	.00	.00	.00	.00
4-5	.00	.00	7.44	1.75	.00	.00	.00	.00
5-6	.00	.00	1.78	1.42	.00	.00	.00	.00
6-7	.00	.00	.00	.19	.00	.00	.00	.00
7-9	.00	.00	.00	.04	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.60	67.40	31.20	.60	.30	.00	.00
								101.10

CHINESE HARBOR  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.78	5.55	.00	.00	.00	.00
1-2	.00	.02	17.40	22.35	.94	.30	.00	.00
2-3	.00	.78	15.26	6.07	.46	.00	.00	.00
3-4	.00	.00	15.78	1.22	.00	.00	.00	.00
4-5	.00	.00	10.00	.27	.00	.00	.00	.00
5-6	.00	.00	1.22	.95	.00	.00	.00	.00
6-7	.00	.00	.37	.31	.00	.00	.00	.00
7-9	.00	.00	.00	.06	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	61.00	36.00	1.40	.30	.00	.00
								101.10

CHINESE HARBOR  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	3.04	5.40	.00	.00	.00	.00
1-2	.00	.03	27.78	24.55	2.83	1.00	.30	.00
2-3	.00	1.67	12.74	9.62	2.24	.20	.00	.00
3-4	.00	.29	3.00	1.02	.43	.00	.00	.00
4-5	.00	.00	2.28	.15	.00	.00	.00	.00
5-6	.00	.00	.36	.45	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	2.00	49.20	41.20	5.50	1.20	.30	.00



CHINESE HARBOR  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	2.29	6.40	.00	.00	.00	8.69
1-2	.00	.02	22.31	25.90	1.37	.77	1.79	52.16
2-3	.00	.81	18.10	8.50	1.03	.93	.71	30.08
3-4	.00	.78	12.87	1.70	.57	.20	.30	16.41
4-5	.00	.00	7.22	2.60	.53	.50	.00	10.85
5-6	.00	.00	2.31	1.47	.00	.20	.00	3.99
6-7	.00	.00	.72	.69	.00	.00	.00	1.40
7-9	.00	.00	.18	.14	.00	.00	.00	.32
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.60	66.00	47.40	3.50	2.60	2.80	123.90

CHINESE HARBOR  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.33	4.75	.13	.00	.00	.00
1-2	.00	.07	15.73	18.00	6.09	2.90	1.10	.30
2-3	.00	3.26	23.20	11.00	4.41	.20	.00	.30
3-4	.00	.79	13.02	9.15	1.57	.00	.30	.00
4-5	.00	.29	4.44	2.35	.48	.53	.00	.00
5-6	.00	.00	2.07	1.52	1.79	.27	.00	.00
6-7	.00	.00	.30	1.19	.54	.00	.00	.00
7-9	.00	.00	.00	.31	.00	.00	.00	.31
9-11	.00	.00	.00	.52	.00	.00	.00	.52
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	4.40	60.10	49.60	15.00	3.90	1.40	.60
								135.00

CHINESE HARBOR  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.01	1.61	2.25	.13	.20	.00	.60	4.79
1-2	.00	.58	17.38	12.45	3.60	6.03	3.01	2.40	45.45
2-3	.00	4.20	22.08	12.37	4.00	3.97	1.99	.30	48.91
3-4	.00	2.65	16.42	4.12	3.64	1.73	.00	.00	28.57
4-5	.00	.77	6.11	7.92	4.82	.57	.00	.00	28.19
5-6	.00	.00	2.60	4.05	.93	.45	.00	.00	8.03
6-7	.00	.00	1.32	1.69	.98	.35	.00	.00	4.34
7-9	.00	.00	.98	1.47	.98	.20	.00	.00	3.63
9-11	.00	.00	.00	.26	.32	.00	.00	.00	.58
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	8.20	68.50	46.60	19.40	13.50	5.00	3.30	164.50



CHINESE HARBOR  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE

WAVE DIRECTION = 292.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.73	3.49	.00	.00	.00	5.23
1-2	.00	.33	17.72	16.01	.00	.00	.00	34.06
2-3	.00	2.70	18.14	8.61	.00	.00	.00	29.46
3-4	.00	1.59	13.92	4.03	.00	.00	.00	19.55
4-5	.00	.41	8.18	3.32	.00	.00	.00	11.90
5-6	.00	.03	3.12	2.51	.00	.00	.00	5.65
6-7	.00	.02	.99	1.46	.00	.00	.00	2.47
7-9	.00	.00	.72	1.41	.00	.00	.00	2.14
9-11	.00	.00	.13	.39	.00	.00	.00	.51
11-13	.00	.00	.07	.15	.00	.00	.00	.22
13-15	.00	.00	.01	.04	.00	.00	.00	.05
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	5.00	64.73	41.42	.00	.00	.00	111.24

CHINESE HARBOR  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 315.00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.14	.11	.06	.05
1-2	.00	.00	.00	.00	2.68	2.39	1.33	.30
2-3	.00	.00	.00	.00	2.53	1.36	.62	.07
3-4	.00	.00	.00	.00	1.61	.72	.21	.00
4-5	.00	.00	.00	.00	1.11	.32	.05	.00
5-6	.00	.00	.00	.00	.77	.18	.07	.00
6-7	.00	.00	.00	.00	.42	.10	.00	.00
7-9	.00	.00	.00	.00	.28	.14	.00	.00
9-11	.00	.00	.00	.00	.17	.07	.00	.00
11-13	.00	.00	.00	.00	.07	.02	.00	.00
13-15	.00	.00	.00	.00	.01	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	9.79	5.43	2.33	.42
								17.98

BECHERS BAY  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE  
ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.82	.00	.00	.00	.00	.00	.00	.00
1-2	9.48	2.54	.00	.00	.00	.00	.00	.00
2-3	2.99	13.31	.00	.00	.00	.00	.00	.00
3-4	.00	9.03	1.20	.00	.00	.00	.00	.00
4-5	.00	1.20	6.24	.02	.00	.00	.00	.00
5-6	.00	.14	3.25	.17	.00	.00	.00	.00
6-7	.00	.01	.87	.56	.00	.00	.00	.00
7-9	.00	.00	.09	1.03	.00	.00	.00	.00
9-11	.00	.00	.00	.24	.00	.00	.00	.00
11-13	.00	.00	.00	.03	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	15.29	26.22	11.64	2.04	.00	.00	.00	.00
								55.20



BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = .00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.00	.00
1-2	.00	2.54	.00	.00	.00	.00	.00	2.54
2-3	.00	13.31	.00	.00	.00	.00	.00	13.31
3-4	.00	9.03	1.20	.00	.00	.00	.00	10.22
4-5	.00	1.20	6.24	.02	.00	.00	.00	7.46
5-6	.00	.14	3.25	.17	.00	.00	.00	3.55
6-7	.00	.01	.87	.56	.00	.00	.00	1.43
7-9	.00	.00	.09	1.03	.00	.00	.00	1.12
9-11	.00	.00	.00	.24	.00	.00	.00	.24
11-13	.00	.00	.00	.03	.00	.00	.00	.03
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	26.22	11.64	2.04	.00	.00	.00	39.91

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 337.50

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	2.82	.00	.00	.00	.00	.00	.00	.00	2.82
1-2	9.48	.00	.00	.00	.00	.00	.00	.00	9.48
2-3	2.99	.00	.00	.00	.00	.00	.00	.00	2.99
3-4	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-5	.00	.00	.00	.00	.00	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	15.29	.00	.00	.00	.00	.00	.00	.00	15.29

BECHERS BAY  
CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.64	.00	.00	.00	.00	.00	.00	2.64
1-2	10.02	1.51	.00	.00	.00	.00	.00	11.53
2-3	4.64	8.05	.00	.00	.00	.00	.00	12.68
3-4	.00	5.95	.00	.00	.00	.00	.00	5.95
4-5	.00	1.18	1.18	.00	.00	.00	.00	2.36
5-6	.00	.21	.60	.20	.00	.00	.00	.81
6-7	.00	.00	.12	.13	.00	.00	.00	.25
7-9	.00	.00	.00	.17	.00	.00	.00	.17
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.30	16.90	1.90	.30	.00	.00	.00	36.40



BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.64	.00	.00	.00	.00	.00	.00	2.64
1-2	8.93	2.46	.00	.00	.00	.00	.00	11.38
2-3	3.23	10.04	.00	.00	.00	.00	.00	13.27
3-4	.00	6.17	.00	.00	.00	.00	.00	6.17
4-5	.00	.75	2.29	.00	.00	.00	.00	3.04
5-6	.00	.08	1.63	.00	.00	.00	.00	1.71
6-7	.00	.00	.71	.13	.00	.00	.00	.84
7-9	.00	.00	.17	.77	.00	.00	.00	.94
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.30	.00	.00	.00	.30
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	14.80	19.50	4.80	1.20	.00	.00	.00	40.30

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	2.99	.00	.00	.00	.00	.00	.00	.00	2.99
1-2	9.67	2.68	.00	.00	.00	.00	.00	.00	12.35
2-3	2.44	17.15	.00	.00	.00	.00	.00	.00	19.59
3-4	.00	11.85	.62	.00	.00	.00	.00	.00	12.47
4-5	.00	1.49	5.93	.00	.00	.00	.00	.00	7.42
5-6	.00	.13	2.98	.00	.00	.00	.00	.00	3.12
6-7	.00	.00	.66	.22	.00	.00	.00	.00	.88
7-9	.00	.00	.00	.28	.00	.00	.00	.00	.28
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	15.10	33.30	10.20	.50	.00	.00	.00	.00	59.10

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	4.59	.00	.00	.00	.00	.00	.00	.00
1-2	14.84	2.21	.00	.00	.00	.00	.00	.00
2-3	4.27	13.45	.00	.00	.00	.00	.00	.00
3-4	.00	9.08	.00	.00	.00	.00	.00	.00
4-5	.00	.86	1.62	.00	.00	.00	.00	.00
5-6	.00	.00	1.22	.00	.00	.00	.00	.00
6-7	.00	.00	.46	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	23.70	25.60	3.30	.00	.00	.00	.00	52.60



BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	4.10	.00	.00	.00	.00	.00	.00	.00
1-2	12.43	3.82	.00	.00	.00	.00	.00	.00
2-3	2.87	19.39	.00	.00	.00	.00	.00	.00
3-4	.00	9.87	3.27	.00	.00	.00	.00	.00
4-5	.00	2.24	18.36	.22	.00	.00	.00	.00
5-6	.00	.58	4.47	.08	.00	.00	.00	.00
6-7	.00	.00	.79	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	19.40	35.90	18.90	.30	.00	.00	.00	.00
								74.50

BECHERS BAY

CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST

POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	4.66	.00	.00	.00	.00	.00	.00	.00
1-2	14.14	4.54	.00	.00	.00	.00	.00	.00
2-3	2.50	21.90	.00	.00	.00	.00	.00	.00
3-4	.00	9.76	3.82	.00	.00	.00	.00	.00
4-5	.00	.51	8.60	.00	.00	.00	.00	.00
5-6	.00	.00	4.26	.00	.00	.00	.00	.00
6-7	.00	.00	1.12	.22	.00	.00	.00	.00
7-9	.00	.00	.00	.28	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	21.30	36.70	17.00	.50	.00	.00	.00	.00
								76.30

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	1.95	.00	.00	.00	.00	.00	.00	.00	1.95
1-2	8.58	2.83	.00	.00	.00	.00	.00	.00	11.41
2-3	4.58	14.26	.00	.00	.00	.00	.00	.00	18.84
3-4	.00	15.37	2.42	.00	.00	.00	.00	.00	17.79
4-5	.00	2.38	13.81	.00	.00	.00	.00	.00	16.19
5-6	.00	.16	7.78	1.29	.00	.00	.00	.00	9.22
6-7	.00	.00	2.33	2.60	.00	.00	.00	.00	4.93
7-9	.00	.00	.17	2.95	.00	.00	.00	.00	3.12
9-11	.00	.00	.00	.96	.00	.00	.00	.00	.96
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.06	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	15.10	35.00	26.50	7.80	.00	.00	.00	.00	84.40



# BECHERS BAY

## CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	3.54	.00	.00	.00	.00	.00	.00	.00
1-2	9.26	1.31	.00	.00	.00	.00	.00	.00
2-3	.00	7.08	.00	.00	.00	.00	.00	.00
3-4	.00	7.33	2.73	.00	.00	.00	.00	.00
4-5	.00	.00	8.88	.00	.00	.00	.00	.00
5-6	.00	.00	4.47	.47	.00	.00	.00	.00
6-7	.00	.00	1.34	1.37	.00	.00	.00	.00
7-9	.00	.00	.28	1.46	.00	.00	.00	.00
9-11	.00	.00	.00	.70	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	12.80	16.60	17.70	4.00	.00	.00	.00	.00
								51.10

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.63	.00	.00	.00	.00	.00	.00	.63
1-2	5.15	3.44	.00	.00	.00	.00	.00	8.59
2-3	5.13	15.40	.00	.00	.00	.00	.00	20.52
3-4	.00	10.76	.23	.00	.00	.00	.00	11.00
4-5	.00	1.32	6.04	.00	.00	.00	.00	7.36
5-6	.00	.00	4.06	.00	.00	.00	.00	4.14
6-7	.00	.00	1.50	.61	.00	.00	.00	2.11
7-9	.00	.00	.17	2.53	.00	.00	.00	2.70
9-11	.00	.00	.00	.26	.00	.00	.00	.26
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	10.90	31.00	12.00	3.40	.00	.00	.00	57.30

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	1.53	.00	.00	.00	.00	.00	.00	.00	1.53
1-2	6.87	1.70	.00	.00	.00	.00	.00	.00	8.57
2-3	3.60	10.23	.00	.00	.00	.00	.00	.00	13.83
3-4	.00	10.13	.00	.00	.00	.00	.00	.00	10.13
4-5	.00	1.82	7.52	.00	.00	.00	.00	.00	9.34
5-6	.00	.39	4.26	.18	.00	.00	.00	.00	4.82
6-7	.00	.12	1.12	1.29	.00	.00	.00	.00	2.54
7-9	.00	.00	.30	2.90	.00	.00	.00	.00	3.20
9-11	.00	.00	.00	.44	.00	.00	.00	.00	.44
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	12.00	24.40	13.20	4.80	.00	.00	.00	.00	54.40



BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	2.36	.00	.00	.00	.00	.00	.00	.00
1-2	6.58	2.02	.00	.00	.00	.00	.00	.00
2-3	.85	11.68	.00	.00	.00	.00	.00	.00
3-4	.00	5.71	.23	.00	.00	.00	.00	.00
4-5	.00	.40	4.34	.00	.00	.00	.00	.00
5-6	.00	.00	1.87	.00	.00	.00	.00	.00
6-7	.00	.00	.25	.13	.00	.00	.00	.00
7-9	.00	.00	.00	.97	.00	.00	.00	.00
9-11	.00	.00	.00	.49	.00	.00	.00	.00
11-13	.00	.00	.00	.11	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	9.80	19.80	6.70	1.70	.00	.00	.00	.00
								38.00

BECHERS BAY  
 CUMULATIVE SEA FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	2.22	.00	.00	.00	.00	.00	.00	.00	2.22
1-2	7.31	1.96	.00	.00	.00	.00	.00	.00	9.27
2-3	1.77	11.14	.00	.00	.00	.00	.00	.00	12.91
3-4	.00	6.33	1.01	.00	.00	.00	.00	.00	7.34
4-5	.00	.57	4.27	.00	.00	.00	.00	.00	4.84
5-6	.00	.00	1.42	.00	.00	.00	.00	.00	1.42
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	11.30	20.00	6.70	.00	.00	.00	.00	.00	38.00

BECHERS BAY  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE  
ANNUAL SUMMARY

HEIGHT (FT)	PERIOD (SEC)						TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	>18
0-1	.00	.02	3.37	3.44	.33	.26	.01
1-2	.00	4.05	13.79	8.89	2.71	2.14	.14
2-3	.00	2.73	10.73	5.88	2.80	1.60	.23
3-4	.00	.28	4.61	4.22	2.13	1.01	.09
4-5	.00	.01	1.52	2.05	1.35	.52	.06
5-6	.00	.00	.50	1.01	.73	.43	.02
6-7	.00	.00	.16	.56	.40	.19	.00
7-9	.00	.00	.07	.48	.35	.20	.00
9-11	.00	.00	.02	.05	.13	.01	.00
11-13	.00	.00	.00	.02	.04	.01	.00
13-15	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	7.09	34.78	26.62	10.97	6.37	.55
							98.66



BECHERS BAY  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JANUARY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	2.52	.36	.00	.13	.00
1-2	.00	3.41	4.04	5.69	1.61	.72	.61	.00
2-3	.00	6.97	13.33	5.14	2.11	1.46	.72	.00
3-4	.00	.96	9.13	6.84	1.99	1.40	.57	.00
4-5	.00	.06	3.93	3.04	2.60	1.46	.10	.00
5-6	.00	.00	.00	3.70	1.01	.00	.22	.00
6-7	.00	.00	.17	1.69	.67	.17	.05	.00
7-9	.00	.00	.00	.68	.64	.50	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	11.40	31.40	29.30	11.00	6.50	2.40	.00
								92.00

BECHERS BAY  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR FEBRUARY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.76	3.86	.00	.13	.13	.00
1-2	.00	2.34	2.46	5.28	.54	.97	.70	.00
2-3	.00	3.27	6.74	1.57	1.06	.81	1.27	.40
3-4	.00	.39	4.96	3.53	2.42	1.50	.59	.28
4-5	.00	.00	1.42	3.84	1.73	.56	.30	.00
5-6	.00	.00	2.10	1.59	1.45	.43	.00	.00
6-7	.00	.00	.78	1.19	.65	.09	.00	.00
7-9	.00	.00	.26	.94	.86	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.00	19.50	21.80	8.70	4.50	3.00	64.10

BECHERS BAY  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MARCH  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.13	.81	2.38	.72	.49	.13	.00
1-2	.00	7.71	9.62	7.50	2.59	3.21	1.06	.27
2-3	.00	4.93	12.58	5.84	3.48	4.22	2.00	.03
3-4	.00	.52	7.72	5.11	4.28	2.49	.48	.00
4-5	.00	.00	2.01	1.90	1.83	.68	.14	.30
5-6	.00	.00	.80	1.38	1.81	.58	.22	.00
6-7	.00	.00	.34	.46	.67	.58	.85	.00
7-9	.00	.00	.43	.73	1.03	.64	.00	.00
9-11	.00	.00	.00	.29	.92	.00	.00	.00
11-13	.00	.00	.00	.28	.43	.00	.00	.00
13-15	.00	.00	.00	.02	.02	.00	.00	.05
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	13.30	34.30	25.90	17.80	12.90	4.00	.60
								100.00



BECHERS BAY  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR APRIL  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	1.62	2.74	.27	.00	.13	.00	4.76
1-2	.00	4.67	9.26	10.55	2.31	3.77	.00	.00	31.45
2-3	.00	2.03	9.76	6.66	2.73	1.53	.00	.00	22.00
3-4	.00	.20	5.01	2.83	2.14	.63	.00	.00	10.81
4-5	.00	.00	1.94	1.56	.45	.10	.00	.30	4.35
5-6	.00	.00	.58	.22	.00	.22	.00	.00	1.01
6-7	.00	.00	.12	.56	.34	.22	.00	.00	1.24
7-9	.00	.00	.01	.99	.26	.43	.00	.00	1.68
9-11	.00	.00	.29	.29	.00	.14	.00	.00	.73
11-13	.00	.00	.00	.00	.00	.16	.00	.00	.16
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.90	28.60	26.40	8.50	7.20	1.10	.30	79.00

BECHERS BAY  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR MAY  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	2.43	4.09	.63	.13	.13	.00
1-2	.00	4.76	16.81	9.06	2.93	1.06	1.33	.27
2-3	.00	1.64	9.88	6.10	3.74	1.01	.64	.03
3-4	.00	.00	3.75	1.53	.40	.59	.39	.00
4-5	.00	.00	.62	1.62	.70	.16	.30	.00
5-6	.00	.00	.00	.58	.58	.36	.00	.00
6-7	.00	.00	.00	.12	.12	.08	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	6.40	33.50	23.10	9.10	3.40	2.00	.30
								78.60

BECHERS BAY  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JUNE  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)								TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	
0-1	.00	.00	1.39	4.49	.63	.85	.00	.00	7.37
1-2	.00	4.76	13.12	9.73	4.10	4.01	.72	.00	36.44
2-3	.00	1.14	13.42	7.26	3.08	1.73	.08	.00	26.72
3-4	.00	.00	3.11	1.20	.39	.00	.00	.00	4.70
4-5	.00	.00	.06	.92	.00	.00	.00	.00	.98
5-6	.00	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	5.90	31.10	23.60	8.20	6.60	.80	.00	76.20



BEACHERS BAY  
 CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR JULY  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	11.95	5.21	.72	.13	.00	.00
1-2	.00	1.44	25.25	10.07	2.77	.17	.00	.00
2-3	.00	.16	7.31	3.72	.01	.00	.00	.00
3-4	.00	.00	.79	.20	.00	.00	.00	.00
4-5	.00	.00	.90	.30	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	1.60	46.20	19.50	4.30	.30	.00	71.90

BECHERS BAY  
CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR AUGUST  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	7.59	3.50	.13	.00	.00	.00
1-2	.00	.72	22.34	13.46	2.86	1.26	.00	.00
2-3	.00	.00	9.15	5.67	1.70	.14	.00	.00
3-4	.00	.00	1.12	2.00	.00	.00	.00	.00
4-5	.00	.00	.10	.06	.00	.00	.00	.00
5-6	.00	.00	.00	.00	.00	.00	.00	.00
6-7	.00	.00	.00	.00	.00	.00	.00	.00
7-9	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.80	40.30	24.70	4.70	1.40	.00	71.90

BECHERS BAY  
CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR SEPTEMBER  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL	
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18		
0-1	.00	.13	5.21	6.96	.36	.13	.00	.00	12.00
1-2	.00	2.68	17.17	17.79	2.96	1.15	.00	.00	41.75
2-3	.00	1.38	7.78	3.82	2.37	.52	.38	.60	16.06
3-4	.00	.00	1.67	4.25	2.91	1.07	1.20	.00	11.10
4-5	.00	.00	1.96	.87	1.34	.52	.12	.00	4.82
5-6	.00	.00	.00	.00	.22	.00	.00	.00	.22
6-7	.00	.00	.00	.00	.05	.00	.00	.00	.05
7-9	.00	.00	.00	.00	.00	.00	.00	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	4.20	33.80	33.70	10.20	3.40	1.70	.60	87.60

87.60



BECHERS BAY  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR OCTOBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	1.17	2.02	.00	1.21	.13	.00
1-2	.00	6.74	17.07	8.77	3.32	4.18	1.60	.00
2-3	.00	3.87	10.44	8.42	4.41	2.68	1.37	.10
3-4	.00	.20	4.60	6.41	2.20	.92	.43	.20
4-5	.00	.00	.69	2.41	.92	.90	.36	.00
5-6	.00	.00	.36	1.30	.94	1.16	.00	.00
6-7	.00	.00	.25	.45	.48	.42	.00	.00
7-9	.00	.00	.13	.63	.21	.13	.00	.00
9-11	.00	.00	.00	.00	.00	.00	.00	.00
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	10.80	34.70	30.40	12.50	11.60	3.90	.30
								104.20

BECHERS BAY

CUMULATIVE NORTH SUELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR NOVEMBER  
DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	5.26	2.88	.13	.00	.00	8.27
1-2	.00	5.75	17.41	5.77	4.12	2.25	1.17	36.73
2-3	.00	3.36	13.30	9.69	4.80	1.33	.74	33.85
3-4	.00	.39	5.77	8.99	4.34	1.40	.43	21.75
4-5	.00	.00	1.93	2.65	1.68	.86	.66	7.88
5-6	.00	.00	.36	1.81	1.59	.88	.00	3.99
6-7	.00	.00	.08	1.81	.79	.45	.17	2.55
7-9	.00	.00	.00	.90	.35	.21	.13	1.60
9-11	.00	.00	.00	.00	.29	.00	.29	.59
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	9.50	44.10	32.90	18.10	7.30	3.60	117.20

BECHERS BAY  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD FOR DECEMBER  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE

HEIGHT (FT)	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18	TOTAL
0-1	.00	.00	2.20	.58	.00	.00	.00	.13	2.92
1-2	.00	3.59	10.97	3.05	2.43	2.97	1.17	.88	25.06
2-3	.00	3.99	15.11	6.69	3.28	3.79	2.51	.99	36.35
3-4	.00	.72	7.73	7.83	4.49	2.12	.33	.20	23.41
4-5	.00	.00	2.66	5.45	4.91	.96	.00	.00	13.98
5-6	.00	.00	1.01	2.39	1.16	.00	.00	.00	5.36
6-7	.00	.00	.21	1.25	1.04	.34	.00	.00	2.84
7-9	.00	.00	.00	.86	.91	.43	.00	.00	2.19
9-11	.00	.00	.00	.00	.29	.00	.00	.00	.29
11-13	.00	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	8.30	39.90	28.10	18.50	11.40	4.00	2.20	112.40



BECHERS BAY  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = .00

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.02	3.37	3.44	.33	.26	.00	.00
1-2	.00	4.05	13.79	8.89	2.71	2.14	.00	.00
2-3	.00	2.73	10.73	5.88	2.88	1.60	.00	.00
3-4	.00	.28	4.61	4.22	2.13	1.01	.00	.00
4-5	.00	.01	1.52	2.05	1.35	.52	.00	.00
5-6	.00	.00	.50	1.01	.73	.43	.00	.00
6-7	.00	.00	.16	.56	.40	.19	.00	.00
7-9	.00	.00	.07	.48	.35	.20	.00	.00
9-11	.00	.00	.02	.05	.13	.01	.00	.00
11-13	.00	.00	.00	.02	.04	.01	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	7.09	34.78	26.62	10.97	6.37	.00	85.83

BELHERS BAY  
 CUMULATIVE NORTH SWELL FREQUENCIES OF WAVE HEIGHT AND PERIOD  
 DEVELOPED FROM NATIONAL MARINE CONSULTANTS HINDCAST  
 POTENTIAL LNG TERMINAL SITE  
 WAVE DIRECTION = 22.50

HEIGHT (FT)	PERIOD (SEC)							TOTAL
	<4-6	6-8	8-10	10-12	12-14	14-16	16-18	>18
0-1	.00	.00	.00	.00	.00	.00	.07	.01
1-2	.00	.00	.00	.00	.00	.00	.77	.14
2-3	.00	.00	.00	.00	.00	.00	.82	.23
3-4	.00	.00	.00	.00	.00	.00	.36	.09
4-5	.00	.00	.00	.00	.00	.00	.16	.06
5-6	.00	.00	.00	.00	.00	.00	.04	.02
6-7	.00	.00	.00	.00	.00	.00	.02	.00
7-9	.00	.00	.00	.00	.00	.00	.01	.00
9-11	.00	.00	.00	.00	.00	.00	.02	.02
11-13	.00	.00	.00	.00	.00	.00	.00	.00
13-15	.00	.00	.00	.00	.00	.00	.00	.00
15-17	.00	.00	.00	.00	.00	.00	.00	.00
17-19	.00	.00	.00	.00	.00	.00	.00	.00
>19	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	.00	.00	.00	.00	.00	.00	2.27	.55
								2.82

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Hales, Lyndell Z

Preliminary evaluation of wind and wave effects at potential LNG terminal sites, State of California; Appendix B: An evaluation of the relative wave climate at six offshore LNG sites considering island influences and topographic effects / by Lyndell Z. Hales. Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1978.

30, #416# p. : ill. ; 27 cm. (Miscellaneous paper - U. S. Army Engineer Waterways Experiment Station ; H-78-2, Appendix B) Prepared for California Coastal Commission, San Francisco, California.

References: p. B30.

1. California. 2. Liquefied Natural Gas terminal sites. 3. Topography. 4. Water wave characteristics. 5. Water wave refraction. 6. Wind (Meteorology). 7. Wind waves. I. California. State Coastal Commission. II. Series: United States. Waterways Experiment Station, Vicksburg, Miss. Miscellaneous paper ; H-78-2 Appendix B.  
TA7.W34m no.H-78-2 Appendix B